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Canadian Nine-year-olds at School

by Eleanor M. Thomas

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Symbols

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.	not available for any reference period
..	not available for a specific reference period
...	not applicable
0	true zero or a value rounded to zero
0s	value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
p	preliminary
r	revised
x	suppressed to meet the confidentiality requirements of the *Statistics Act*
E	use with caution
F	too unreliable to be published

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Canadian Nine-year-olds at School

by Eleanor M. Thomas

1 Objective

The purpose of this report is to provide an overview of the school achievement of Canadian 9-year-old children in 2006/2007. The paper focuses on similarities and differences between girls and boys; between children from low-income and higher-income homes; between provinces; and, where relevant, between communities of different sizes. The report looks at the education environments of the children and at links between environment and achievement. The report also examines the links between early school readiness indicators at age 5 and school achievement at age 9, when the children were in grade 3 and grade 4. Specific objectives include:

- to present descriptive data on the school achievement of Canadian 9-year-olds;
- to report on aspects of the education environment at home and at school that may be associated with school achievement, and to determine whether any of these were linked to outcomes at age 9;
- to examine links between school readiness indicators at age 5 and school achievement at age 9.

2 Background and rationale

At age 9 most Canadian children who attend school are in grade 3 or grade 4, depending on the school entry cut-off date of their province of residence and on their progression through the school system since kindergarten. The transition from the primary grades to the junior grades at this stage in the children's academic careers is a significant one. Between the primary and junior levels the academic program changes from one focused on developing basic literacy, numeracy and other skills to a subject-based curriculum which assumes that these skills are in place. If children have not acquired these skills before the junior years, their chance for success in the later grades is reduced (Stanovich 1986; Griffin 2004).

Children with low achievement at the end of the primary years may continue to struggle as they move through the school system, and even with intervention they may not catch up with their peers. In reading in particular, students who fail to master the basic reading skills early tend to fall farther and farther behind their classmates over time (Stanovich 1986). In mathematics, too, when fundamental skills are not mastered in the early elementary years at school, students may be unable to master more advanced concepts that are taught in later grades (Griffin and Case 1996; Griffin 2004; Ontario Ministry of Education 2004).

Because of the importance of the skills and knowledge that children bring with them as they enter the junior years of elementary school, most provinces in Canada undertake standardized testing of students towards the end of grade 3. The purpose of the assessments is to monitor change in achievement over time in the province, and to examine certain factors that may affect the academic performance of students. For example, the Ontario Education Quality and Accountability Office (EQAO 2008) administers standardized tests of reading, writing and mathematics to all grade 3 students throughout the province in May and June each year, along with surveys that collect information about their schools and families. Alberta Education undertakes provincial assessments of all grade 3 students in reading, writing and mathematics, also in May and June (Alberta Education n.d.). The Program of Learning Assessment for Nova Scotia (PLANS) assesses grade 3 student reading literacy in September and

October, and mathematics literacy in June (PLANS n.d.). Other provinces have similar assessment programs. Detailed information is available on the websites of their departments of education.

The present report focuses on the school achievement of children around the time of this important transition in their school careers. However, because the sample of 9-year-olds does not include all children in grade 3 or grade 4, the analyses and conclusions do not refer to grade 3 or grade 4 students. They refer either to all 9-year-old children, or to 9-year-old children in those grades.

2.1 Demographic factors in school achievement

2.1.1 Gender

Gender differences in school achievement are of major interest to educators and policy analysts, and such differences are one focus of the present report. Gender differences in achievement are evident in many stages in the education system, from kindergarten to university.

Gender differences are already evident in the preschool stage, where some school readiness measures show variations between girls and boys, favouring girls (Thomas 2006).

Gender differences are also found in the elementary grades. In Canada and other jurisdictions, in grade 3 girls have been found to outperform boys in reading and writing, in standardized tests and in school achievement (e.g., EQAO 2008; Logerfo, Nichols and Reardon 2006). However, in mathematics, differences have been small or non-existent (e.g., EQAO 2008; Logerfo et al. 2006; Tremblay, Ross and Berthelot 2001).

At the secondary school level, the Programme for International Student Assessment (PISA) measures the reading, mathematics and science skills of 15-year-old students in over 50 countries around the world. In 2006, PISA results showed that in all of the provinces of Canada girls outperformed boys in reading, while boys outperformed girls in mathematics in seven provinces, with no gender differences in the remaining three (Bussière, Knighton and Pennock 2007; Gluszynski 2007).

Gender differences are also found at the post-secondary level, as measured by participation rates. Female students made up 58% of the university population in Canada and male students 42% in 2007/2008 (Statistics Canada 2009).

The present report extends our knowledge about gender differences in the school achievement of Canadian children when they were 9 years old, at the end of the primary grades.

2.1.2 Household income level

Socioeconomic status as measured by household income level has been a consistent predictor of school achievement at all levels in the school system in most jurisdictions, and is a topic investigated in this report.

In the preschool years substantial differences have been found between socioeconomic groups in many school readiness measures, with children from low income families consistently scoring lower on most measures, in Canada (Thomas 2006) and elsewhere (Lee and Burkam 2002; West, Denton and Germino-Hausken 2000).

In elementary school this trend is also evident: lower income children in grade 3 have consistently scored below those from more affluent families in standardized tests of reading and mathematics (EQAO 2008; Logerfo et al. 2006). An examination of socioeconomic status and school achievement at this grade level found that students from low income families had lower achievement than those from more affluent families (Logerfo et al. 2006; Tremblay, Ross and Berthelot 2001).

Studies using PISA data have reported that for 15-year-olds, low income is associated with lower scores in all domains (reading, mathematics and science) compared with higher income (Bussière et al. 2007; Gluszynski 2007).

At the post-secondary level, in Canada students from low income families are less likely to attend university or other post-secondary education institutions than those from higher income families (Frenette 2007).

The present report extends our knowledge about differences in the school achievement of 9-year-old children in Canada, depending on family income level.

2.2 The education environment of children

The education environment of children can include many different dimensions. The topics of interest in this study include parent attitudes about their child's education, parent involvement in the child's schooling, both at home and at school, and the positive climate of the school itself.

Parental involvement in schooling is believed to be linked to student academic achievement, but conflicting results have been reported in the research literature, as discussed by Shumow and Miller (2001). Some researchers have found positive links while others have found negative associations or none at all. As an example of contradictory results, in a recent study, McBride et al. (2009) found that mothers' school involvement was positively related to school achievement, while fathers' school involvement was negatively related. In some studies, parent at-home and in-school involvement have been linked to the school achievement of young adolescents (Connolly, Hatchette and McMaster 1999; Gluszyinski 2007; Gregory and Weinstein 2004; Paulson 1994; Paulson, Marchant and Rothlisberg 1998; Shumow and Miller 2001; Spera 2006) and of younger students (EQAO 1997; Ertl 2000; Ryan and Adams 1999; Tremblay et al. 2001). Of particular interest is the finding that parents of struggling students are more involved in assisting with homework than other parents, while parents of more successful students tend to be more involved at the child's school (Shumow and Miller 2001).

Shumow and Miller (2001) summarized the contradictory evidence about the role of parent involvement, and concluded that the reasons for the contradictions included the fact that the outcomes studied differed, and that parental school involvement was defined differently across the studies. Some studies used school grades as their outcome measure and used reports by the students themselves to assess parent involvement in the school. For example, Paulson et al. (1998) used self-reported school grades as an outcome measure, and asked students to what extent they agreed with five statements about parent involvement in school, such as "My parents are not involved in school programs for parents", and "My parents usually go to activities in which I am involved in school". Shumow and Miller (2001) used school grades to assess achievement, and used parent report to assess parent involvement. However, in addition to items asking about visits to the school and participation in parent-teacher organizations, their measure of parental academic involvement included items about parent attentiveness to local school issues, a concept that differs considerably from an activity-based assessment. The outcome measure used by McBride et al. (2009) was a composite of reading and math achievement as measured by a standard psychological battery. To assess parent involvement, they asked parents how often they engaged in school activities, with items such as how often they had volunteered in the classroom or participated in conversations with the child's teacher. This variability in definitions and procedures has made it difficult to draw conclusions about the relationship between parent involvement in schooling and student achievement.

There is some evidence that the climate and atmosphere of schools is linked to student outcomes, with better outcomes being associated with more positive schools (Paulson et al. 1998).

The present report examines these and other dimensions of the education environment of Canadian 9-year-olds, to extend what is known about environmental factors related to education, and to consider possible links between these factors and school outcomes.

2.3 School readiness and school achievement

School readiness skills are linked to early success at school (Denton and West 2002; Ladd 2003; Lonigan 2006; Rathburn and West 2004; Rouse, Brooks-Gunn and McLanahan 2005; Thomas 2006; U.S. Department of Health and Human Services 2003; West, Denton and Reaney 2001), and early school success underlies future achievement in school (Ramey, Campbell, Burchinal, Skinner, Gardner and Ramey 2000; Reynolds and Temple 1998; U.S. Department of Health and Human Services 2003).

School readiness has been defined as the ability of the child to meet the task demands of school (Janus and Offord 2007; Janus, Brinkman et al. 2007), and the concept has been interpreted broadly by most jurisdictions. The framework for studying school readiness that was formulated by the National Education Goals Panel (NEGP) in the United States included five dimensions: health and physical development; emotional well-being and social competence; approaches to learning; communication skills; and cognition and general knowledge (NEGP 1997). This conceptualization has been adopted by many researchers, educators and policy advisors.

Gender and socioeconomic differences in school readiness have been reported in many jurisdictions, including the United States (Lee and Burkam 2002; West, Denton and Germino-Hausken 2000) and Canada (Thomas 2006).

In the Canadian report, the school readiness of 5-year-old children in Canada was examined in detail (Thomas 2006). That report used data from the National Longitudinal Survey of Children and Youth (NLSCY), and studied children born in 1997 who became 5 years old in 2002. Among other results, the report found that 5-year-old children varied on several dimensions of school readiness, depending on their gender and family income level. Minor differences appeared between girls and boys in receptive vocabulary and number knowledge. However, girls scored considerably higher than boys in copying and symbol use, and in attention ability.

Children from low income families did not do as well as those from more affluent households in many of the readiness-to-learn dimensions. This was true for all of the readiness dimensions being considered in the present report, including receptive vocabulary, number knowledge, copying and symbol use, and attention ability (Thomas 2006).

Variations were also found according to province of residence in children's number knowledge, copying and symbol use, and receptive vocabulary, but not in attention ability (Thomas 2006).

2.4 School readiness indicators in the present report

In the present report, the focus is on cognitive aspects of readiness to learn, rather than social, emotional or behavioural aspects. The school readiness indicators studied here include measures from three of the five dimensions in the NEGP framework: number knowledge, and copying and using symbols (both measures of cognition and general knowledge); receptive vocabulary (a communication skill); and attention ability (an approach to learning). This report extends the findings of the 2006 report on school readiness (Thomas 2006) by linking early readiness to learn indicators with school outcomes and school achievement four years later, using a longitudinal approach. When considering school readiness and later school achievement in the present report, gender, income and provincial differences are taken into account where appropriate.

2.5 The present study

The present report uses data from the National Longitudinal Survey of Children and Youth (NLSCY), to present an overview of how Canadian children are doing at school at age 9. The NLSCY provides information about the demographic characteristics of the children and their families, about their academic achievements, and about their education environments. As a longitudinal survey, it also provides detailed information about the school readiness of these children four years earlier, when they were 5 years old. This study takes advantage of the broad range of questions in the NLSCY to explore the links among these dimensions of education and to extend our knowledge about the educational development of elementary school children in Canada.

This report presents an overview of Canadian 9-year-olds at school in 2006/2007. These are the same children who were studied four years earlier, when they were aged 5, as reported in the Canadian research paper on school readiness cited above (Thomas 2006). The current study examines their school achievement and education environments at age 9 when they were in grade 3 and grade 4, and looks at demographic characteristics that may be linked to these variables. It also examines links between their early school readiness indicators at age 5 and their later school achievement using longitudinal data analysis.

The report sought to answer the following research questions:

- Are there differences in the school achievement of Canadian 9-year-olds depending on the sex of the child, family income level, and province of residence?
- Are there differences in the education environments of these students depending on the sex of the student, family income level, and province of residence?
- Are the education environments of 9-year-olds linked to their school achievement?
- To what extent are school readiness indicators at age 5 associated with school achievement at age 9? Are there differences in these links depending on the sex of the child, family income level, and province of residence?
- Do the education environments of children modify the links between their school readiness indicators at age 5 and their school achievement at age 9?

3 Methods and procedures

3.1 Participants

The children studied in this research project included all 9-year-olds in the third longitudinal cohort of the National Longitudinal Survey of Children and Youth (see Section 8). These children were born between April and December in 1997, and were 9 years old as of December 31, 2006. Altogether 3,379 children were included in the sample, representing approximately 373,300 9-year-olds in the Canadian population in 2006. Of these, an estimated 55,700 were in grade 3 and 308,900 were in grade 4 at school, while a small number were in lower or higher grades or were ungraded. Note that because of the sample selection procedure, no children who were born in the first four months of the year were included in the study; therefore, conclusions apply to a population of 9-year-olds that is relatively young, and the percentage who were in grade 3 is higher than would be found in the Canadian population of all 9-year-olds.

3.2 Measures

Much of the information in the survey was provided by the person most knowledgeable about the child, usually the mother. She provided information about the child, the environment, and the family.

Some direct measures of the child's ability were also included. In the present report, one direct measure was administered at age 9, a mathematics achievement test called the Mathematics Computation Exercise. At age 5, three direct measures were available, including: a Number Knowledge Assessment; "Who Am I?", which is a test of developmental level that assesses the ability of a child to copy shapes and to reproduce symbols like letters, words and numbers (De Lemos 2002); and a test of receptive vocabulary, the Peabody Picture Vocabulary Test - Revised (PPVT-R). Details about these measures appear in Section 9.

3.2.1 Child and family characteristics (demographic variables)

Several child and family characteristics were included as predictor variables in the analyses. The focus in the present report was on the sex of the child and household income level. Where relevant, community size and province of residence were also considered, as was the school grade of the child.

3.2.2 Measures of school achievement at age 9

The measures of school achievement at age 9 examined in this report include:

- mathematics achievement
- attention ability

- repeating a grade
- participating in a special education program for academic problems
- receiving tutoring or extra help for academic problems
- parent report of how well the child was doing at school, both overall and by subject.

3.2.3 Measures of the education environment at age 9

The environment of the child may include factors at home and school that are supportive of his or her education. Measures of the education environment in this report, all based on parent report, include:

- frequency of homework assignments
- parent attitudes about the importance of good grades, and about their education aspirations for the child
- parent involvement in schooling, including talking to the child about school work and behaviour; talking about activities and friends; and checking homework
- parent participation in the child's school
- positive school climate.

3.2.4 Indicators of school readiness at age 5

An earlier report using data from the NLSCY presented detailed information about a number of indicators of school readiness among 5-year-olds in Canada (Thomas 2006). In the present report, four of these indicators were included as predictor variables in the analyses, including:

- number knowledge
- copying and symbol use
- receptive vocabulary
- attention ability.

3.3 Data analysis and statistical procedures

Statistical and substantive significance. The concept of substantive, or practical, significance refers to the usefulness or importance of a statistical finding. It is relevant to all statistical testing, but is particularly important where sample size is large, because the power of statistical tests to detect statistically significant differences increases as sample size increases (Cohen 1988). Even small effects with little practical relevance may be statistically significant given enough power. Because of the large size of the sample under study in this report, many statistics were statistically significant even though the effects were small. Unless noted otherwise, only effects that were both statistically and substantively significant, as defined in Section 10, are reported as significant in this paper.

Are there differences in school achievement depending on child and family characteristics? To answer the question of whether there were important differences in school achievement between demographic groups, the means of the continuous outcome measures at age 9 were compared for the child and family characteristics under study. Categorical school outcome measures were cross-tabulated with child and family characteristics. Patterns among school achievement measures were studied using mean comparisons and linear and logistic regression procedures.

Are there differences in education environment depending on child and family characteristics? The question of whether there were differences in the education environment of different demographic groups was answered by cross-tabulating the environment measures at age 9 with the child and family characteristics under study.

Is school achievement linked to education environments? The question of whether school outcome was linked to education environment was answered by comparing mean scores on the mathematics test at age 9 for different levels of the education environment variables.

Is school achievement linked to school readiness indicators? A series of linear and logistic regression analyses was undertaken to answer the question of whether education outcomes at age 9 were associated with school readiness indicators at age 5, and whether these links depended on the sex of the child or on family income level. Regression analyses were conducted separately for individual provinces, to establish whether links were consistent across the country regardless of province of residence. Means of the school readiness indicators at age 5 were compared between children according to their achievement at age 9, to illustrate the relationships established by the regression analyses.

Are links between school achievement and school readiness indicators modified by the education environment of the child? Regression analyses were completed to determine whether mathematics achievement was linked to the child's number knowledge skill at age 5 after the education environment of the child and relevant demographic variables were accounted for.

4 Results

4.1 Descriptive statistics

4.1.1 Population descriptive statistics

The percentages and numbers of children in various demographic categories (with standard errors of the percentages) appear in Table 1. The table shows that 15.2% of the children were in grade 3 and 84.2% were in grade 4, with a small percent in other grades or ungraded. The children were evenly split between girls and boys, and 14.6% of them lived in households with income levels that fell below the low income cut-off (LICO). The province of residence of the children was 41.5% Ontario, 21.9% Quebec, 12.2% British Columbia, and 11.0% Alberta, with the other 6 provinces accounting for the remaining 13.3%. Other descriptive information about the sample appears in Table 1.

Table 1
Children in the population by child and family characteristics

	Population		
	percent	standard error	number [1]
School grade at age 9			
Grade 3	15.2	0.72	55,700
Grade 4	84.2	0.77	308,900
Other (grade 1, 2, 5, ungraded)	F	F	F
Sex of child			
Girls	48.8	0.00	182,100
Boys	51.2	0.00	191,300
Household income level (2-level)			
Below low income cut-off	14.6	0.87	54,600
Low income cut-off or above	85.4	0.87	318,700
Household income level (4-level)			
Below low income cut-off	14.6	0.87	54,600
Low income cut-off to less than 2 times low income cut-off	36.0	1.02	134,300
Two times to less than 3 times low income cut-off	26.6	0.91	99,200
Three times low income cut-off or above	22.8	0.89	85,200
Parent education level			
High school or less	31.7	1.13	117,200
More than high school	68.3	1.13	252,800
Missing	...	...	3,400
Family structure			
One-parent family	17.5	0.95	65,300
Two-parent family	82.5	0.95	308,000
Country of birth of parent			
Not Canada	20.6	0.93	74,400
Canada	79.4	0.93	286,900
Missing	...	...	12,000
Community size - population			
Rural	13.1	1.72	49,000
Under 30,000	8.9	1.13	33,300
30,000 to under 100,000	10.9 E	2.04	40,600
100,000 to under 500,000	18.3	1.68	68,300
500,000 and over	48.8	1.03	182,100
Province of residence			
Newfoundland and Labrador	1.4	0.00	5,300
Prince Edward Island	0.4	0.00	1,600
Nova Scotia	2.6	0.00	9,900
New Brunswick	2.1	0.00	7,900
Quebec	21.9	0.00	81,600
Ontario	41.5	0.00	155,000
Manitoba	3.7	0.00	13,900
Saskatchewan	3.1	0.00	11,500
Alberta	11.0	0.00	41,000
British Columbia	12.2	0.00	45,700
All children	**100.0**	...	**373,300**

1. Population number has been rounded to the nearest 100. Total sample n = 3,379.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

4.2 School achievement and child and family characteristics

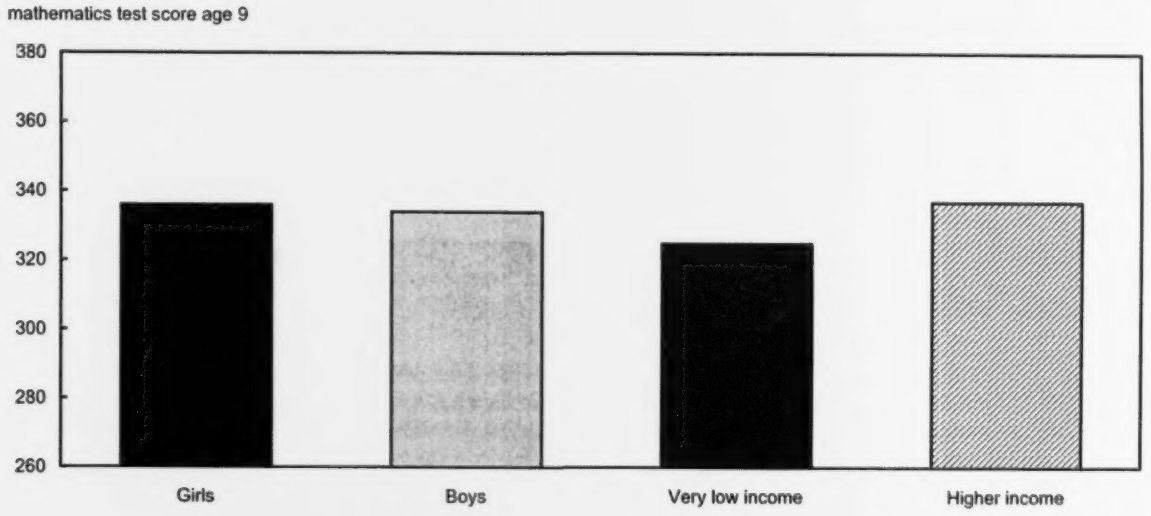
4.2.1 Mathematics achievement

Mathematics achievement was directly measured in the NLSCY by use of a mathematics computation test appropriate for the school grade of the child. The mathematics test was designed to measure knowledge normally acquired in school. Because the test differed for students in grade 3 and grade 4, all analyses involving the mathematics test score were performed separately for the two grades.

Girls and boys did not differ in mathematics achievement in either grade 3 or grade 4 (Chart 1 and 2; Table A). This finding is consistent with studies reported earlier which found only minor differences between girls and boys in mathematics ability in the elementary grades (EQAO 2008; Logerfo et al. 2006).

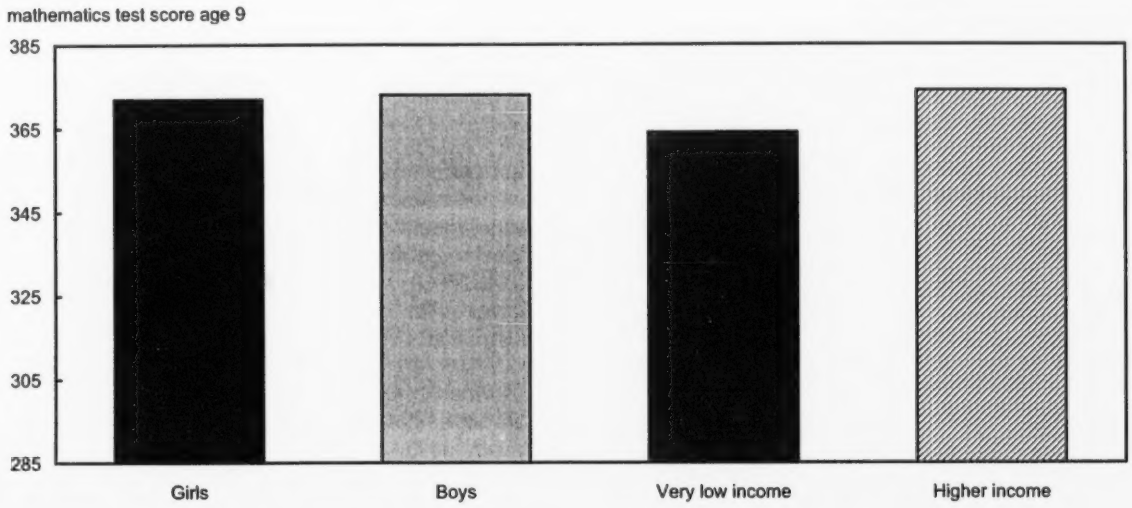
Although children from very low income households, that is, children from households whose income fell below the low income cut-off, scored somewhat lower than those from higher income households on the mathematics test in grades 3 and 4, as found by other researchers (e.g., Logerfo et al. 2006; Tremblay, Ross and Berthelot 2001), the differences were not substantively significant, as defined in Section 10 (Chart 1 and 2; Table A).

Chart 1
Mean mathematics test score at age 9 (grade 3) for girls and boys and for children from very low income and higher income families



Note(s): Score of 260 corresponds to the lower 5th percentile of the grade 3 mathematics test score distriibution.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

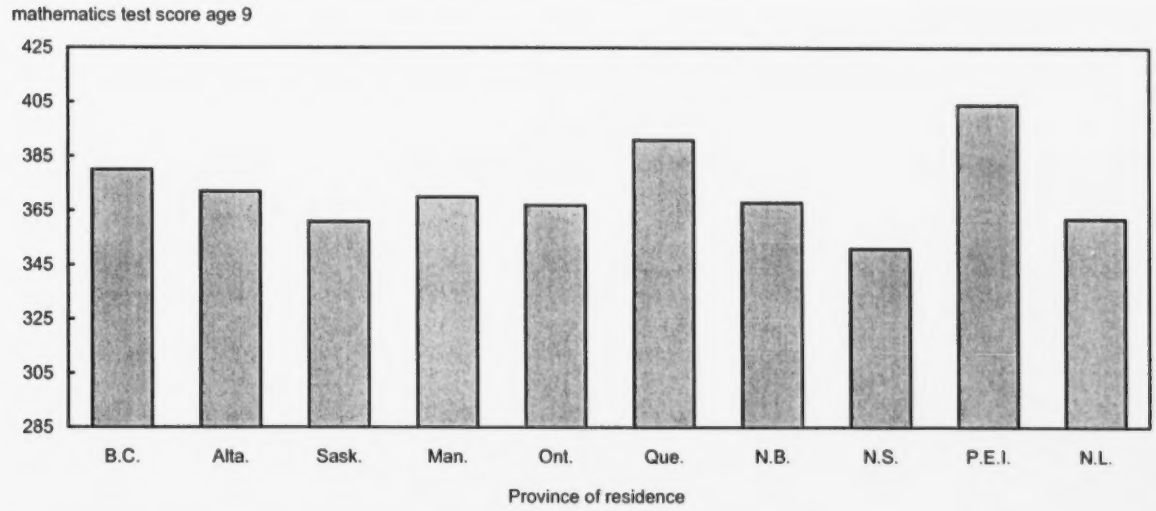
Chart 2
Mean mathematics test score at age 9 (grade 4) for girls and boys and for children from very low income and higher income families



Note(s): Score of 285 corresponds to the lower 5th percentile of the grade 4 mathematics test score distribution.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

Differences appeared among the provinces in mathematics test score in grade 4 (Chart 3; Table A). Students in Prince Edward Island scored significantly higher than students in all other provinces except Quebec, and students in Quebec and British Columbia scored higher than those in many other provinces. Students in Nova Scotia scored lower than those in several provinces. Note that comparisons among provinces could not be carried out for grade 3 mathematics scores because of the low numbers of children in the lower grade in most provinces.

Chart 3
Mean mathematics test score at age 9 (grade 4) by province of residence



Note(s): Score of 285 corresponds to the lower 5th percentile of the grade 4 mathematics test score distribution.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

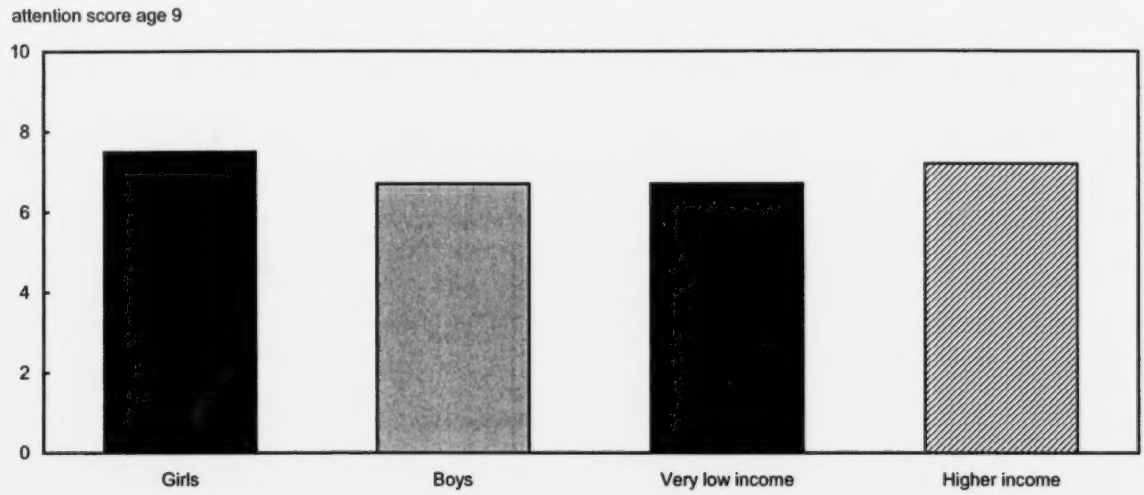
There are parallels between these findings for 9-year-olds and the PISA patterns of provincial differences reported earlier for 15-year-olds. In the PISA findings (Bussiere et al. 2007), students in both Quebec and Alberta scored relatively high, and those in Newfoundland and Labrador and in Nova Scotia scored relatively low, as found here. However, in Prince Edward Island the 9-year-olds had the highest mean mathematics test scores at age 9, but the PISA scores for 15-year-olds in that province were relatively low.

4.2.2 Attention ability

Attention is an important academic ability that can be considered both a school outcome and a predictor of other school outcomes. To measure attention ability at age 9, parents were asked a series of five questions about their child's attention-related behaviour (see Section 9 for a description of the attention ability score). Attention ability scores ranged from 0 (low attention) to 10 (high attention), with an overall mean of 7.1 (Table B).

Girls and boys differed in parent-reported attention ability at age 9, with girls being rated significantly higher than boys (Chart 4; Table B). This finding on gender differences in attention is consistent with much educational and clinical research, where girls are typically found to have stronger attention skills than boys (West, Denton and Germino-Hausken 2000).

Chart 4
Mean attention score at age 9 for girls and boys and for children from very low income and higher income families



Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

Children in very low income households were rated somewhat lower in attention ability than those in higher income households, but the difference did not reach statistical significance (Chart 4; Table B).

No provincial differences appeared for parent-reported attention ability (Table B).

4.2.3 Repeating a grade, special education, tutoring

One indicator of how well a child is doing at school is whether the child has repeated a grade. Parents were asked whether the child had ever repeated a grade at school. Overall, 3.6% of 9-year-olds had repeated a grade. Almost all of these children were in grade 3. Altogether, 21.4% of grade 3 students had repeated a grade, while charts for grade 4 were too low to report, as were charts for other grades (Table 2).

Boys were somewhat more likely than girls to have repeated a grade, but the difference did not reach statistical significance. A significantly higher percentage of children from very low income families had repeated a grade than children from higher income families (Table 2).

Table 2
Children at age 9 who had repeated a grade, participated in special education programs, or received tutoring or extra help for academic problems by child and family characteristics

	Repeated a grade		Special education program		Tutoring or extra help	
	percent	standard error	percent	standard error	percent	standard error
School grade at age 9						
Grade 3 (n=512)	21.4	2.4	6.2[E]	1.55	28.2[1]	2.50
Grade 4 (n=2798)	F	F	3.0	0.45	19.9	1.02
Other	F	F	F	F	F	F
Sex of child						
Girls	2.5[E]	0.48	2.8[E]	0.56	18.6[1]	1.30
Boys	4.7	0.68	4.6	0.71	24.0	1.29
Household income level						
Very low income	8.9[E,1]	1.73	5.1[E]	1.54	27.1	2.82
Higher income	2.7	0.40	3.4	0.45	20.4	1.05
All children	**3.6**	**0.45**	**3.7**	**0.46**	**21.4**	**0.98**

1. Statistically significant and substantive difference between levels.
Note(s): Statistical significance: p<0.01 for differences between levels. Substantive differences are defined as percentage differences of 5 points or more (see Section 10 for effect sizes where proportions are small).
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

Additional indicators of school achievement at age 9 include whether the child is participating in a special education program for academic problems, and whether he or she is receiving tutoring or extra help for academic problems. In the survey, parents were asked whether the child was in enrolled in special education or was receiving tutoring or extra help, and why. Altogether, 3.7% of the children were participating in special education programs for academic problems, and 21.4% were receiving tutoring or extra help for academic problems.

As shown in Table 2, girls and boys did not differ in participation in special education. In contrast, a lower percentage of girls than boys were receiving tutoring or extra help. Although a higher percentage of children from very low income families than from higher income families were participating in special education programs, or were receiving tutoring or extra help at age 9, these differences did not reach statistical significance.

Comparison of rates of repeating a grade, participation in special education programs, or receiving tutoring or extra help for academic problems among provinces was not possible because of the low numbers for these variables.

4.2.4 Parent report: How well is the child doing at school?

Parents were asked how well their child was doing at school overall, in mathematics, in reading, and in written work. The percentages of children reported to be doing well or very well as opposed to average or poorly appear in Table 3.

Table 3
Children at age 9 who were reported to be doing well or very well at school by child and family characteristics

	Child is doing well or very well	
	percent	standard error
How is the child doing overall?		
Girls	79.5 [1]	1.30
Boys	69.1	1.43
Very low income	62.4 [1]	2.83
Higher income	76.1	0.97
All children	**74.2**	**0.95**
How is the child doing in reading?		
Girls	77.6 [1]	1.33
Boys	67.6	1.47
Very low income	61.8 [1]	3.05
Higher income	74.3	1.02
All children	**72.5**	**0.99**
How is the child doing in written work?		
Girls	71.0 [1]	1.47
Boys	54.0	1.60
Very low income	54.0 [1]	3.05
Higher income	63.7	1.09
All children	**62.3**	**1.01**
How is the child doing in mathematics?		
Girls	70.1	1.52
Boys	72.9	1.38
Very low income	61.3 [1]	3.05
Higher income	73.2	1.02
All children	71.5	1.01

1. Statistically significant and substantive difference between levels.
Note(s): Statistical significance: p<0.01 for differences between levels. Substantive differences are defined as percentage differences of 5 points or more.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

Parents reported that girls were doing better than boys overall, with 79.5% of girls and 69.1% of boys doing well or very well. A similar pattern appeared for reading and written work, with a higher percentage of girls doing well or very well. In contrast, parents reported no difference between girls and boys in how well the child was doing in mathematics, with 70.1% of girls and 72.9% of boys doing well or very well.

Significant differences appeared between children from very low income and higher income families in parent report of how the child was doing, both overall and in all individual subjects, with the lower income children scoring lower on these measures, as shown in Table 3.

No provincial differences were seen for parent report of how the child was doing, either overall or in the individual subjects (data not provided).

4.3 Patterns of school achievement

Correlations among school outcome measures are presented in Table 4. Charts are presented separately for grade 3 and grade 4 students because some of the outcome measures differed between the two grades. Significant associations were found among many of the outcome measures for students in both grades. Students who ranked well on one outcome measure tended to rank well on the others.

Table 4
Correlations among academic outcome variables at age 9

	ATTENT [1]	REPEAT [2]	SPECED [3]	TUTOR [4]	OVERL [5]	READG [6]	WRITG [7]	MATH [8]
Grade 3								
MATHSC [9]	0.20	0.20	0.17	0.20	0.32 [10]	0.28 [10]	0.27 [10]	0.36 [10]
ATTENT [1]	...	0.26 [10]	0.25 [10]	0.32 [10]	0.47 [10]	0.39 [10]	0.42 [10]	0.36 [10]
REPEAT [2]	...	...	0.10	0.30 [10]	0.29 [10]	0.23 [10]	0.23 [10]	0.29 [10]
SPECED [3]	...	...	...	0.17	0.27 [10]	0.18	0.24 [10]	0.18
TUTOR [4]	...	...	...	...	0.42 [10]	0.40 [10]	0.41 [10]	0.33 [10]
OVERL [5]	...	...	...	...	...	0.78 [10]	0.79 [10]	0.70 [10]
READG [6]	...	...	...	...	...	...	0.78 [10]	0.52 [10]
WRITG [7]	...	...	...	...	...	...	...	0.54 [10]
MATH [8]	...	...	...	...	...	...	...	...
Grade 4								
MATHSC [9]	0.15	...	0.11	0.17	0.27 [10]	0.21	0.25 [10]	0.30 [10]
ATTENT [1]	...	...	0.18	0.27 [10]	0.40 [10]	0.34 [10]	0.39 [10]	0.31 [10]
REPEAT [2]	...	...	...	...	...	...	...	...
SPECED [3]	...	...	...	0.19	0.24 [10]	0.21	0.19	0.19
TUTOR [4]	...	...	...	...	0.42 [10]	0.42 [10]	0.40 [10]	0.34 [10]
OVERL [5]	...	...	...	...	...	0.77 [10]	0.77 [10]	0.70 [10]
READG [6]	...	...	...	...	...	...	0.74 [10]	0.55 [10]
WRITG [7]	...	...	...	...	...	...	...	0.55 [10]
MATH [8]	...	...	...	...	...	...	...	...

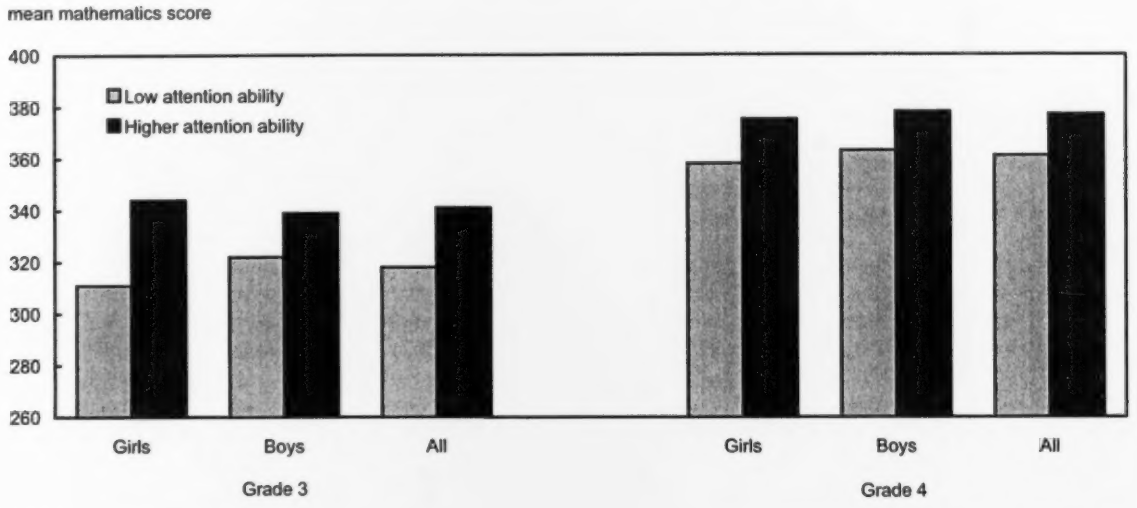
1. ATTENT=Attention score.
2. REPEAT=Repeated a grade (1=yes, 2=no).
3. SPECED=Participation in special education program (1=yes, 2=no).
4. TUTOR=Receiving extra help or tutoring (1=yes, 2=no).
5. OVERL=how doing overall (1=very poorly/5=very well).
6. READG=how doing in reading (1=very poorly/5=very well).
7. WRITG=how doing in written work (1=very poorly/5=very well).
8. MATH=how doing in mathematics (1=very poorly/5=very well).
9. MATHSC=Mathematics test score.
10. Correlation coefficient differs significantly and substantively from 0.

Note(s): For grade 3, sample n ranged from 446 to 512. For grade 4, sample n ranged from 2561 to 2798. Statistical significance of correlation coefficients: $p<0.001$. Substantive correlation coefficients are defined as $r >= 0.22$ ($r^2 = 0.05$).

Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

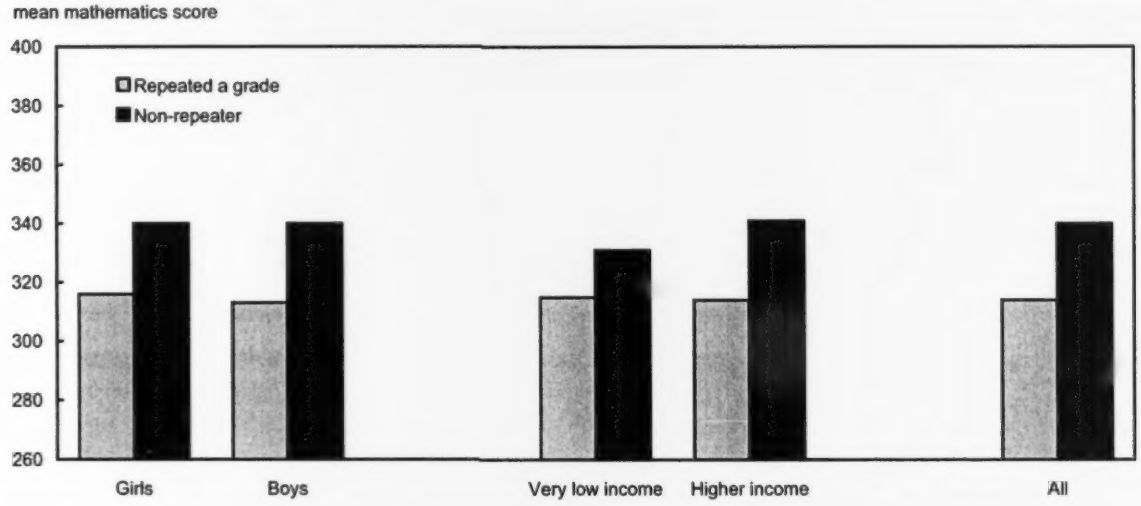
Higher mathematics achievement was linked with higher attention ability for students in grade 3 and grade 4, more so for girls than for boys (Chart 5; Table C). For students in grade 3, higher mathematics achievement was associated with not repeating a grade (Chart 6; Table C). For students in both grades, higher mathematics achievement was associated with parent report that the child was doing well in mathematics at school (Chart 7; Table C).

Chart 5
Mean mathematics score for girls and boys in grade 3 and 4 by attention ability at age 9



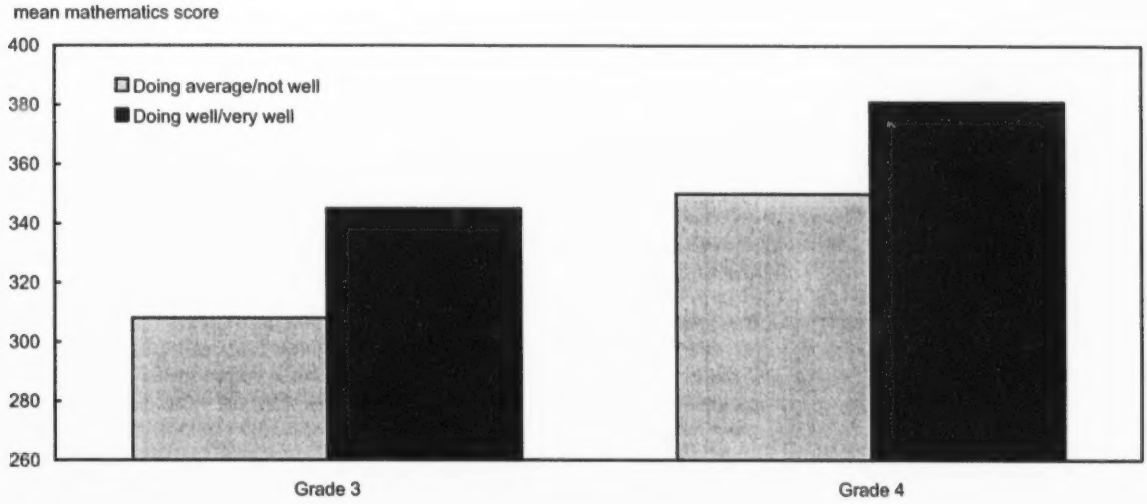
Note(s): Score of 260 corresponds to the lower 5th percentile of the grade 3 mathematics test score distribution. For this analysis, low attention ability includes those with attention scores at or below the 25th percentile. Slight inconsistencies between tables and figures are due to small numbers of cases where the score is not available for all variables in the analyses.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

Chart 6
Mean mathematics score in grade 3 for girls and boys and for children from very low income and higher income families by whether they had repeated a grade



Note(s): Score of 260 corresponds to the lower 5th percentile of the grade 3 mathematics test score distribution. Slight inconsistencies between tables and figures are due to small numbers of cases where the score is not available for all variables in the analyses.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007

Chart 7
Mean mathematics score in grade 3 and 4 for chidren who were reported to be doing average/not well or well/very well in mathematics at age 9



Note(s): Score of 260 corresponds to the lower 5th percentile of the grade 3 mathematics test score distribution.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007

Parent report. The NLSCY relies on parent report for almost all information about young children, excepting only the direct measures. The question can be raised as to how valid and reliable are parent reports about the child. The fact that the NLSCY includes a direct measure of mathematics achievement and also asks parents how well the child was doing in mathematics at school allows for an assessment of the accuracy of parent report. The findings reported in Chart 7 (Table C) suggest that parents do a reasonable job of reporting how their children are doing at school, at least in mathematics.

In addition to mathematics achievement, higher attention ability was linked with not repeating a grade, with not participating in special education, and with not receiving tutoring for academic problems. Higher attention ability was also linked with parent report that the child was doing well in school (Table 5).

Table 5
Attention score at age 9 by academic outcome variables

	Attention score	
	mean	standard error
All Children	**7.1**	**0.06**
Repeater	5.5[1]	0.38
Non-repeater	7.2	0.06
Repeated a grade		
Girls		
Repeater	6.2	0.71
Non-repeater	7.5	0.07
Boys		
Repeater	5.2[1]	0.40
Non-repeater	6.8	0.08
Very low income		
Repeater	5.5	0.61
Non-repeater	6.9	0.17
Higher income		
Repeater	5.5[1]	0.47
Non-repeater	7.2	0.06
Special education program for academic problems		
Participating in special education	4.5[1]	0.36
Not participating in special education	7.2	0.06
Receiving tutoring or extra help for academic problems		
Receiving tutoring/extra help	5.8[1]	0.14
Not receiving tutoring/extra help	7.5	0.06
How well is the child doing at school?		
Average, not well	5.7[1]	0.13
Well, very well	7.6	0.06

1. Statistically significant and substantive difference between levels.
Note(s): Statistical significance: p<0.01 for differences between levels. Substantive differences are defined as mean differences of 0.25 of a standard deviation (0.25 SD) or more, as follows: for attention score at age 9, 0.25 SD=0.62.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

In addition to the connections between parent report that the child was doing well in school on the one hand and mathematics achievement and attention ability on the other, positive parent report was associated with not repeating a grade, and with not participating in special education or tutoring for academic problems (Table 6).

Table 6
Children who had repeated a grade, who participated in a special education program, or who were receiving tutoring or extra help by parent report of how well they were doing at school

	Reapeated a grade		In a special education program		Receiving tutoring or extra help	
	percent	standard error	percent	standard error	percent	standard error
How well is the child doing at school?						
Average, not well	8.1[E,1]	1.34	10.5[1]	1.46	47.9[1]	2.36
Well, very well	2.0	0.32	1.0[E]	0.26	12.1	0.90
All children	**3.6**	**0.45**	**3.4**	**0.44**	**21.3**	**0.98**

1. Statistically significant and substantive difference between levels.
Note(s): Slight inconsistencies between tables are due to small numbers of cases where the score is not available for all variables in the analysis. Statistical significance: p<0.01 for differences between levels. Substantive differences are defined as percentage differences of 5 points or more.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

Repeating a grade, and receiving tutoring or extra help for academic problems tended to be associated (Table 7).

Table 7
Children who were receiving tutoring or extra help by whether they had repeated a grade at age 9

	Receiving tutoring or extra help	
	percent	standard error
Repeated a grade		
Repeater	54.7 [1]	6.34
Non-repeater	20.2	0.92
All children	**21.4**	**0.98**

1. Statistically significant and substantive difference between levels.
Note(s): Statistical significance: p<0.01 for differences between levels. Substantive differences are defined as percentage differences of 5 points or more. Slight inconsistencies between tables are due to small numbers of cases where the score is not available for all variables in the analysis.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

4.4 Gender and income differences in patterns of achievement

Mathematics achievement and attention ability. Although girls and boys did not differ in mathematics achievement at age 9, they differed significantly in attention, with girls being rated considerably higher than boys, as discussed earlier. For this reason, the link between attention and mathematics achievement was examined separately for girls and boys, to determine whether attention was linked to mathematics scores to the same extent for the two genders.

Differences were found between girls and boys in grade 3. In this grade, attention ability was significantly linked to mathematics achievement for girls, but not for boys (Chart 5; Table C). Girls who were low in attention ability had a mean score on the mathematics test that was significantly below girls with higher attention ability. The pattern was similar for boys, but the difference was not statistically significant. Chart 5 (Table C) illustrates these patterns. In a separate regression analysis, attention ability accounted for 8% of the variance in the mathematics test score for girls, and 1% of the variance for boys in grade 3. In grade 4, attention ability was significantly linked to mathematics achievement for both girls and boys, but again the connection was stronger for girls, with attention accounting for 4% of the variability in the mathematics test scores for girls and 1% for boys. (Regression tables are available from Statistics Canada.)

Mathematics achievement and repeating a grade. Students in grade 3 who had repeated a grade had lower mean mathematics test scores than did those who were in grade 3 but had not repeated a grade (Table C). The same significant results were found for boys, and for children from higher income families when these groups were examined separately: those who had repeated a grade had lower math scores than those who had not repeated a grade. Trends were similar for girls and for children from low income families, but because of low numbers in these groups, statistical significance was not established. Too few children in grade 4 had repeated a grade to allow for a similar analysis to be completed for that grade.

Attention ability and repeating a grade. Repeating a grade was linked to low attention scores, especially for boys. Repeaters who were male scored significantly below non-repeaters in attention ability. A similar trend appeared for female students, but numbers were too low to confirm the significance of the trend. The link between repeating a grade and low attention appeared both for children from very low income families and for children from more affluent families, but the link for very low income families did not reach statistical significance because of low numbers. These patterns are presented in Table 5.

4.5 Education environment at home and school

In this study, the education environment of the child included parent attitudes about education, parent involvement in the child's schooling and homework, parent participation in school activities, and the positive climate of the school itself (details about these measures appear in Section 9).

4.5.1 Parent attitudes: importance of good grades and academic aspirations

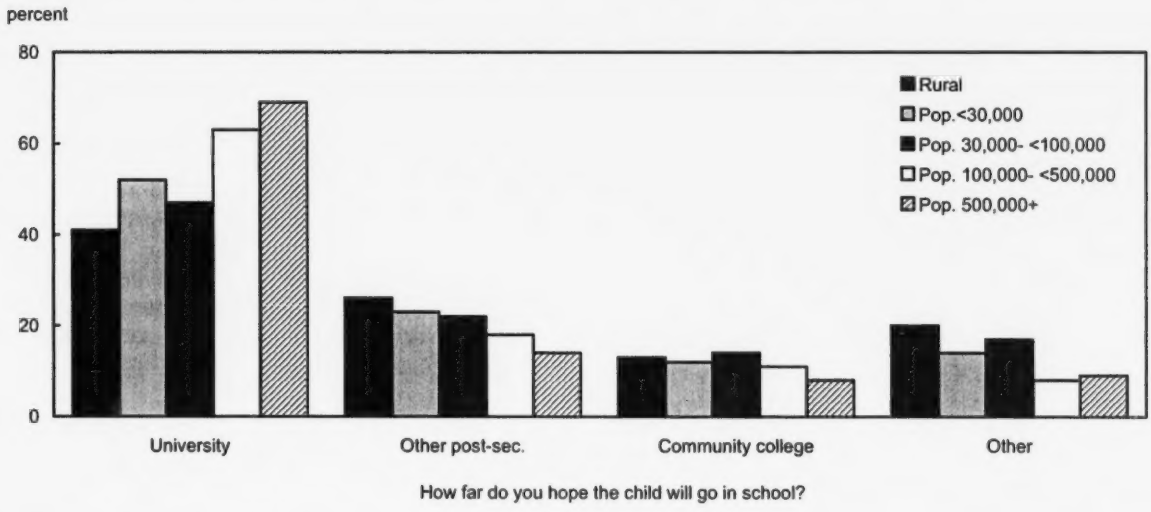
Parents were asked about how important it was to them that the child have good grades in school. Altogether, 60.1% of the parents reported that they felt that school grades were very important, 33.6% that they were important, and 6.3% that they were only somewhat important or not important. No difference appeared for girls and boys or for parents in lower income or higher income families (Table D).

Parents were asked about how far they hoped the child would go in school. University was the response of the parents of 60.5% of the children. Other post-secondary education was mentioned by the parents of 17.9% of the children, community college by parents of 10.1%, and completion of secondary school or less, or participation in non-academic training by parents of 11.5% (Table E).

Patterns were similar for girls and boys, but differences appeared depending on household income level. While parents of 50.2% of children from very low income homes expected that their children would attend university, parents of 62.2% of children from higher income homes did so. Similarly, parents of 23.8% of children from very low income homes had secondary school completion or less, or non-academic training as their goal for their children, compared with parents of 9.4% of children from higher income homes (Table E).

The academic aspirations of parents for their children varied depending on the size of the community where the family lived. A lower percentage of children living in rural than urban areas had parents who indicated university as their choice, and the percentage of children with parents who hoped for university education for them tended to increase with increasing community size (Chart 8; Table E). However, most children in communities of all sizes had parents who hoped for some kind of postsecondary education. Differences in the kind of postsecondary education chosen may arise from the availability of various options, given that most universities are located in large urban areas, while community colleges and other training options are more widespread (Frenette 2004, 2007).

Chart 8
Percent of children with parents reporting various academic aspirations for the child by community size



Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

4.5.2 Parent involvement in the child's schooling

Parents of 68.0% of the students reported that they talked with their child daily about school work and behaviour in class. These patterns were similar for girls and boys, and for children from very low income and higher income homes. Parents of 72.8% of the students reported that they talked with their child daily about school friends and

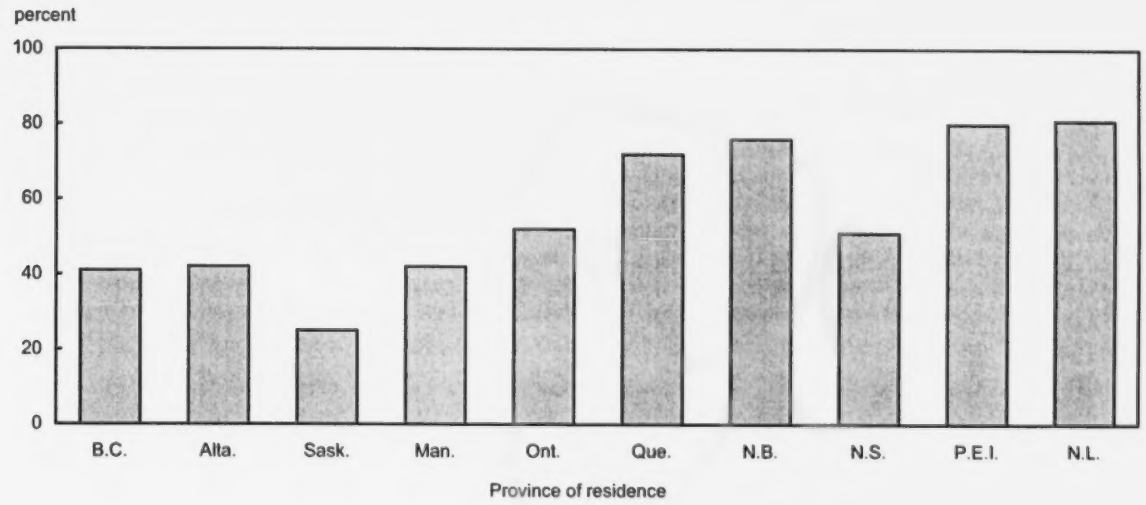
activities. As for discussions about school work and behaviour, these patterns were similar for girls and boys. However, this was not the case for children from different income level households. A lower percentage of the parents of children in very low income families (63.8%) than in higher income families (74.3%) talked with their child every day about friends and activities (Table F).

4.5.3 Frequency of homework

At age 9, school children varied considerably in the frequency with which they were assigned homework. Almost all children (98.0%) were assigned homework at least occasionally. Parents of 15.4% of the children reported that they had homework assigned once per week or less, another 30.9% had homework a few times per week, while 53.7% had daily homework. Differences between grade 3 and grade 4 students in homework frequency were minor (data not provided).

The percentages of girls and boys who had daily homework did not differ, 52.7% and 54.5% respectively, nor did the percentages of low income and higher income children who had daily homework, 53.9% and 53.6% respectively (Table G).

Chart 9
Percent of 9-year-old children with daily homework by province of residence



Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

Substantial differences in the frequency of daily homework appeared among the ten provinces, as seen in Chart 9 (Table G). In most of the western provinces, well under half of the children were reported to have daily homework, while in most of the Atlantic provinces and in Quebec, over 70% had daily homework, with Ontario and Nova Scotia falling in the middle range.

4.5.4 Parents and homework

Parents reported that they monitored homework regularly (Table H). Of the children who had daily homework, 81.7% had parents who reported checking or providing help with their homework every day, while 11.8% reported doing so a few times a week. Among children who did not have daily homework, 68.4% had parents who reported checking or providing help with homework regularly, with 26.4% checking or helping with homework daily and another 42.0% doing so a few times per week.

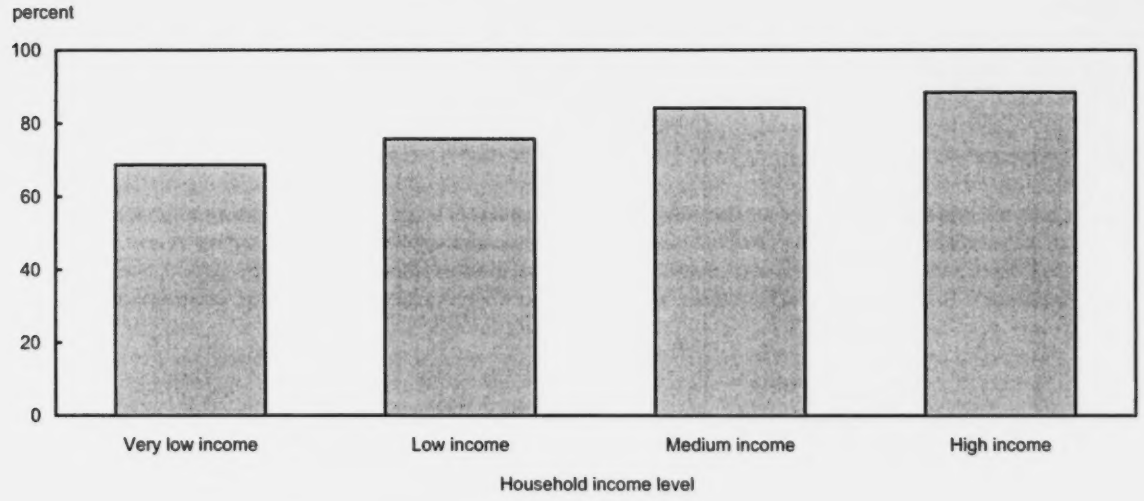
Consistent with the findings on the frequency of having homework assigned, no differences appeared between girls and boys or between children from low income and higher income families in the frequency with which parents reported checking or helping with homework (Table H). Substantial differences appeared among the provinces in the frequency with which parents reported checking or helping with homework, in line with the frequency with which homework was assigned (data not provided).

4.5.5 Parent participation at the child's school

Parents reported that they were active at their child's school. They were asked whether during the past school year they had taken part in each of eight different school-related activities, such as speaking to their child's teacher, attending a school event, volunteering in class, or participating in fund-raising for the school (see Section 9). A large majority of children, 79.9%, had parents who participated in four or more such activities. Almost all children had parents who had spoken to their child's teacher, 96.6%, while 88.9% had visited the child's class, and 83.8% had attended a school event in which the child was participating (data not provided).

Parents of girls and boys were similar in their activities at school (Table I). On average, children from lower income households had parents who participated in significantly fewer school activities than higher income parents, with 68.7% of children from very low income households having parents who participated in four or more activities compared with 81.7% of those from higher income households. Participation increased with increasing income levels, as shown in Chart 10 (Table I).

Chart 10
Percent of children whose parents participated in four or more activities at school by household income level



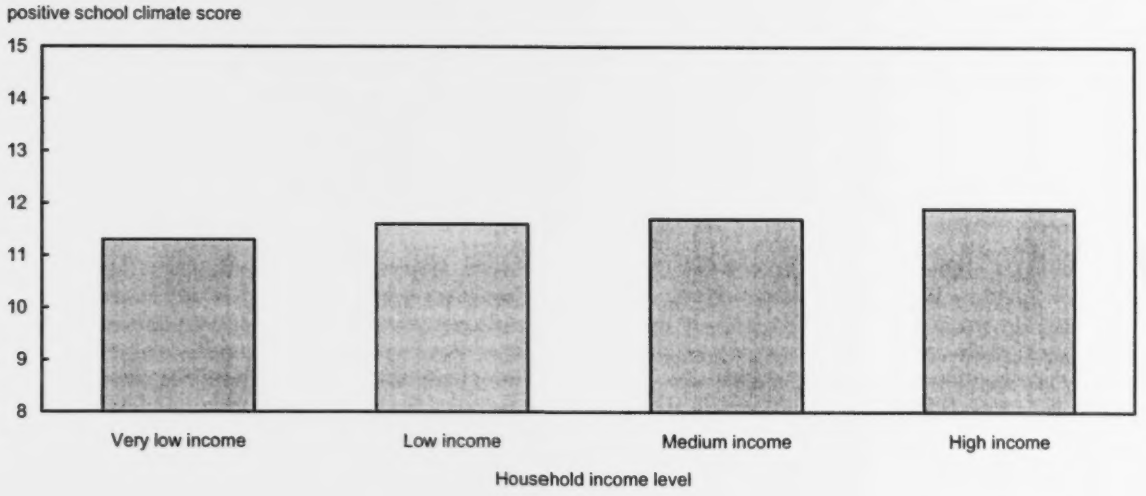
Note(s): Income levels are defined in Section 9.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

4.5.6 Positive school climate

The climate of the child's school was rated from not positive to highly positive, based on parent responses to five questions about how positive the atmosphere and attitudes were at the school. Examples of statements include "Most children in this school enjoy being there", and "Parents are made to feel welcome in this school" (see Section 9 for a description of the school climate score). Scores ranged from a low of zero, where the parent disagreed strongly with all five positive statements about the atmosphere and attitudes at the school, to a high of fifteen, where the parent agreed strongly with those statements.

The mean positive school climate score was 11.7, with no differences between girls and boys (Table J). Household income differences were found for school climate, as shown in Chart 11 (Table J). Children from very low income households had parents who reported lower positive school climate ratings than those from high income households, with low and medium income households falling between these values. No significant differences in positive school climate appeared between those in grade 3 and 4 or between urban and rural schools.

Chart 11
Mean positive school climate score by household income level



Note(s): Income levels are defined in Section 9. Score of 8 corresponds to the lower 5th percentile of the positive school climate score distribution.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

4.6 Education environment and school mathematics achievement

Another research question investigated in this report concerned links between children's education environments and their school achievement at age 9. To address this question, the analysis focused on mathematics achievement at age 9 as a function of the education environment variables. Mathematics achievement was selected as the outcome measure in these analyses because as a direct measure, it was not subject to parent-report bias. The other outcome measures examined in this report were based on parent report, as were the education environment variables under study. To determine whether the education environment was linked to mathematics achievement regardless of the pre-existing mathematics ability and knowledge of the child, the child's number knowledge score at age 5 was included as a control variable in a series of regression analyses.

Parent attitudes: importance of good grades. For students in grade 3, but not grade 4, mathematics achievement varied according to parent attitudes towards the importance of getting good grades in school. Students in grade 3 whose parents felt that good grades were not important or only somewhat important had lower mean mathematics test scores than those whose parents felt that good grades were important or very important (Table 8).

Table 8
Mathematics test score in grade 3 and 4 by education environment variables

	Mathematics test score			
	Grade 3		Grade 4	
	mean	standard error	mean	standard error
Importance of getting good grades (number)	**423**	...	**2,431**	...
Not or somewhat important [1]	307	10.62	364	6.30
Important	336 [2]	5.10	373	2.44
Very important	339 [3]	4.55	374	1.72
Parent talks to child about school (number)	**423**	...	**2,429**	...
Once per week or less [1]	326	8.92	368	5.43
A few times per week	337	6.29	378	2.59
Daily	336	4.16	372	1.63
Parent talks to child about friends (number)	**423**	...	**2,429**	...
Once per week or less [1]	340	13.11	361	7.15
A few times per week	338	6.56	376	2.87
Daily	335	3.94	373	1.60
Parent checks homework (number)	**415**	...	**2,408**	...
Once per week or less [1]	352	7.48	377	3.34
A few times per week	341	8.92	376	2.48
Daily	330 [3]	4.05	370	1.89
Parent participation in school activities (number)	**423**	...	**2,431**	...
Fewer than four activities [1]	335	4.27	376	3.76
Four or more activities	336	5.91	372	1.48
Positive school climate (number)	**382**	...	**2,268**	...
Low positive school climate [1]	331	4.91	371	2.46
Higher positive school climate	336	4.34	373	1.77

1. Reference level.
2. Statistically significant and substantive difference from reference level, p<0.012.
3. Statistically significant and substantive difference from reference level, p<0.01.

Note(s): Substantive differences are defined as mean differences of 0.25 of a standard deviation (0.25 SD) or more, as follows: for mathematics score in grade 3, 0.25 SD=12.66; in grade 4, 0.25 SD=12.62.

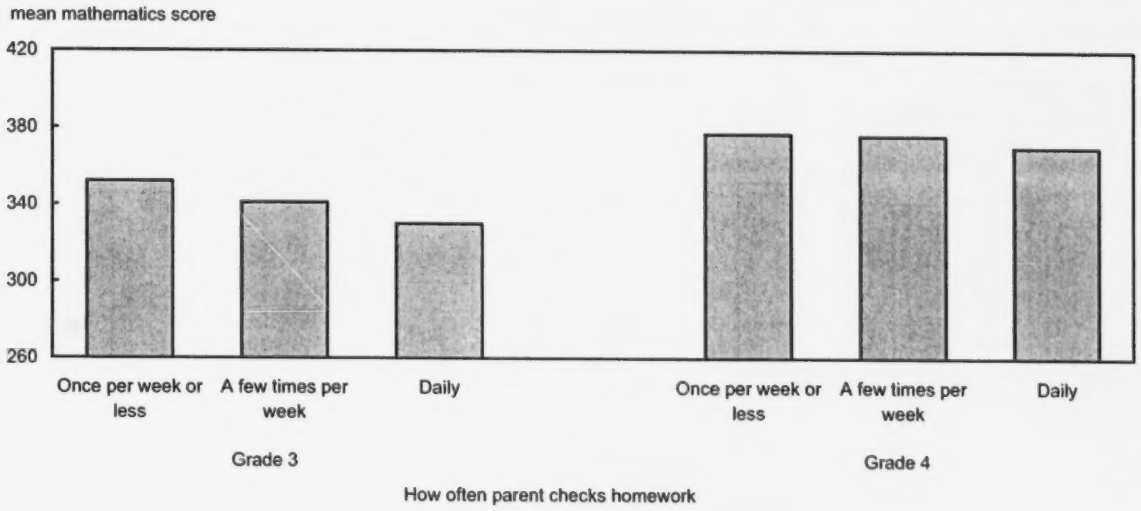
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

A series of linear regression analyses indicated that after controlling for number knowledge at age 5, parent attitudes toward good grades continued to be linked to mathematics achievement for grade 3 students but not for grade 4 students. Parent attitudes toward good grades accounted for a marginally significant 1.9% of the variance in the mathematics test score in grade 3 after controlling for number knowledge. (Regression tables are available from Statistics Canada.)

Parent involvement in the child's schooling. Children whose parents reported talking to the child frequently about school work did not differ from other children in mathematics achievement, for both grade 3 and grade 4 students. Similar results were found for parents talking to the child about friends and activities (Table 8). Controlling for number knowledge at age 5 in a series of regression analyses, with household income as a control variable, did not change these conclusions. (Regression tables are available from Statistics Canada.)

Homework. No differences appeared in mathematics achievement between those with daily homework and those with less frequent homework (data not provided). However, parent involvement with homework was linked to the mathematics test score for grade 3 students. Children in grade 3 whose parents checked or helped with their homework on a daily basis had significantly lower mean mathematics test scores than those whose parents checked their homework once a week or less, as shown in Chart 12 (Table 8). Children whose parents checked or helped with homework a few times a week had mean mathematics test scores that fell between the other two groups. A similar trend was seen for grade 4 students, but differences were small and did not reach statistical significance. These findings are consistent with reports in the research literature showing that parents of students who were having difficulty in school were more involved in assisting with homework than other parents (Shumow and Miller 2001).

Chart 12
Mean mathematics score for children in grade 3 and 4 by how often parent checks homework



Note(s): Score of 260 corresponds to the lower 5th percentile of the grade 3 mathematics test score distribution.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

A series of linear regression analyses indicated that after controlling for number knowledge at age 5, parent involvement with homework continued to be negatively linked to mathematics achievement for grade 3 students, but not grade 4 students. Parent involvement accounted for a marginally significant 1.8% of the variance in the mathematics test score in grade 3 after controlling for number knowledge. (Regression tables are available from Statistics Canada.)

Parent participation at the child's school. Children whose parents were active participants in school activities did not differ from those with less active parents in mathematics achievement, for grade 3 and grade 4 (Table 8). Controlling for number knowledge at age 5 using regression analyses, with household income included as a control variable, did not change these conclusions. (Regression tables are available from Statistics Canada.)

These findings agree with studies finding no links or negative links (see discussion in Shumow and Miller 2001), but contradict studies described earlier reporting that higher parent involvement with the child's school was linked to higher school achievement (EQAO 1997; Paulson et al. 1998; Shumow and Miller 2001). Not all research has found positive links between parent involvement and academic outcomes. As noted earlier, Shumow and Miller (2001) summarized the contradictory evidence about the role of parent involvement, and concluded that one of the reasons for the contradictions was that the outcomes studied differed, and another was that parental school involvement was defined differently across the studies. In the present study the outcome measure used was a standardized mathematics score, and parent involvement was assessed by asking parents whether they had taken part in each of eight activities at the child's school in the past year. In contrast, Paulson et al. (1998) used school grades as an outcome measure and assessed parent involvement by asking students to what extent they agreed with five statements about parent involvement in school. Shumow and Miller (2001) used school grades as an outcome measure. They included items about parent attentiveness to local school issues in their measure of parent involvement, a concept that differs considerably from the activity-based assessment of participation in the present study. McBride et al. (2009) measured achievement using a composite score that included both literacy and mathematics measures, derived from three subtests from a standard learning battery. Because the measures and procedures of these and other studies in the literature are not the same as those of the present report, results are not comparable.

Positive school climate. Children who attended schools with a high positive school climate did not differ from those in less positive schools in mathematics achievement (Table 8). This was true for both grade 3 and grade 4 students. When number knowledge at age 5 was controlled in a series of regression analyses, with household income included as a control variable, the conclusions were unchanged. (Regression tables are available from Statistics Canada.) These findings are not consistent with research showing that positive school climate was linked to the school achievement of grade 5 and 6 students (Paulson et al. 1998), possibly because of different measures used to assess school climate. The present study used a 5-item parent report about the climate of the school, while the earlier study incorporated a 10-item self-report scale that focused on how warm, nurturing and safe the students perceived the school to be.

4.7 School readiness indicators at age 5 and school achievement at age 9

School readiness refers to the abilities, behaviours and attitudes that children bring with them when they start school. School readiness dimensions that were assessed in the NLSCY included language and communication skill, academic skill, self-regulation of learning, self-control of behaviour, and social competence and independence (Thomas 2006). The present report studied cognitive aspects of school readiness. Four specific indicators of the cognitive dimensions of school readiness were considered: number knowledge; copying and symbol use; receptive vocabulary; and attention ability. These indicators are described in detail in Section 9.

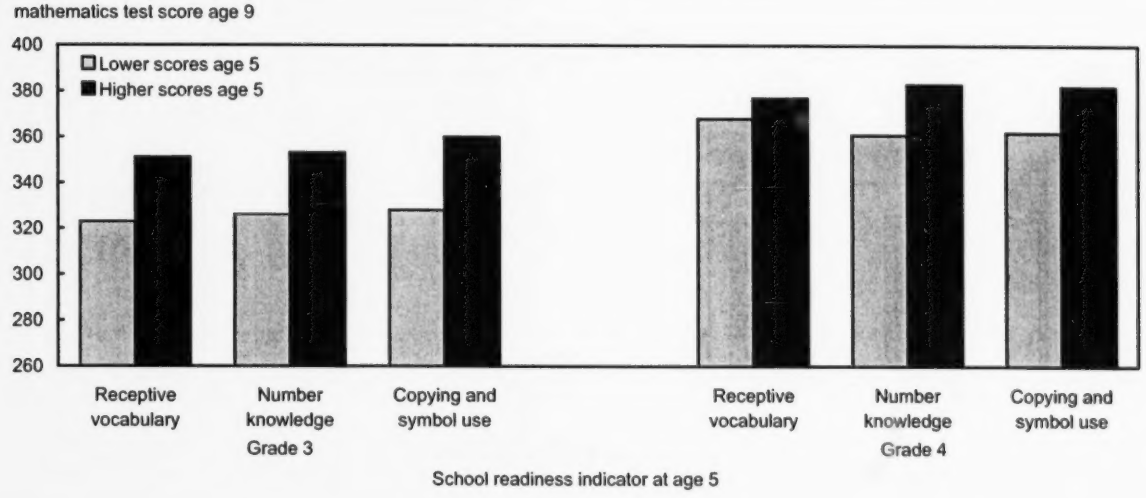
4.7.1 School readiness indicators at age 5 were linked to mathematics achievement at age 9.

Three direct measures of school readiness at age 5 as measured in the NLSCY were linked to mathematics test scores at age 9 for children in both grades, but the effect was stronger for those in grade 3 than for those in grade 4 for all readiness indicators (Chart 13; Table K).

Nine-year-old children in both grade 3 and grade 4 who had higher number knowledge and higher copying and symbol use scores at age 5 had significantly higher mathematics achievement at age 9 than those with lower scores. Similarly, those in grade 3 with higher receptive vocabulary scores at age 5 had higher mathematics achievement at age 9 than those with lower scores. For those in grade 4, the trend for receptive vocabulary was the same, but the difference did not account for sufficient variance in the mathematics score to be considered substantively significant (Chart 13; Table K).

These patterns held equally for girls and boys and for children from both low income and higher income families (data not provided).

Chart 13
Mean mathematics score at age 9 for children in grade 3 and 4 according to school readiness at age 5



Note(s): Lower scores at age 5 were below the median; higher scores were above the median. Score of 260 corresponds to the lower 5th percentile of the grade 3 mathematics test score distribution.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2002/2003 and 2006/2007.

4.7.2 Provincial variation in school readiness indicators and mathematics achievement

Grade 4 mathematics test scores at age 9 differed among the provinces (Chart 3; Table A). As reported in an earlier paper (Thomas 2006), the school readiness indicator at age 5, number knowledge, also differed. The variations in number knowledge at age 5 did not follow the same pattern as the mathematics test scores at age 9 that were shown in Chart 3 (Table A). At age 5, number knowledge scores were higher in Ontario than in New Brunswick, Quebec, Alberta and British Columbia and higher in Newfoundland and Labrador than in Quebec. No other provincial differences in number knowledge at age 5 were statistically significant (Thomas 2006, p. 76).

In an effort to determine whether number knowledge was linked to mathematics outcome in some provinces but not others, regression analyses were conducted separately for the ten provinces, using number knowledge at age 5 as the relevant readiness measure. The percent of variance in the grade 4 mathematics test score at age 9 that was accounted for by number knowledge at age 5 in each province appears in Table 9. The table shows that in seven provinces, number knowledge at age 5 accounted for significant variance in mathematics test scores at age 9. In Prince Edward Island, Nova Scotia and Québec, early number knowledge was not linked to later mathematics achievement. (Regression tables are available from Statistics Canada.)

Table 9
Variance in grade 4 mathematics test score at age 9 accounted for by number knowledge at age 5, by province

	Variance R-squared
	percent
Newfoundland and Labrador	12 [1]
Prince Edward Island	1
Nova Scotia	4
New Brunswick	6 [1]
Quebec	1
Ontario	9 [1]
Manitoba	5 [1]
Saskatchewan	9 [1]
Alberta	13 [1]
British Columbia	10 [1]

1. R-squared differs significantly from 0 at p<0.01.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2002/2003 and 2006/2007.

These findings may reflect the different school experience of children in the different provinces in 2002, when the children were 5 years old. In the seven provinces where number knowledge was linked to mathematics achievement in grade 4, the percentage of 9-year-olds whose parents reported that they were attending school four years previously, when they were aged 5, ranged from 88% to 98%. The percentages in the remaining three provinces were lower: close to zero in Prince Edward Island, 68% in Nova Scotia, and 74% in Québec. The link between early number knowledge and later mathematics skills would be stronger for who were in school at age 5 than for those who were in other more varied child care or education settings, because number knowledge would be taught formally to those in school while those not in school may or may not have received formal instruction in number knowledge. The number knowledge scores of the former would be less variable than the latter. This may have produced differences between the provinces in the link between their number knowledge and mathematics test scores. The numbers of children who did or did not attend school at age 5 were too low in most provinces to allow this speculation to be tested statistically.

4.7.3 Attention ability at age 5 and attention ability at age 9

Attention ability affects all aspects of learning, in school and outside. It has been linked to understanding, memory, behaviour, social success, and other dimensions of school achievement (Spira and Fischel 2005). Attention ability is considered by developmental psychologists to be an enduring aspect of a child's disposition, both in the context of normal temperament (e.g., Posner and Rothbart 1998; Rothbart and Bates 1998) and as a fundamental aspect of the syndrome known as Attention Deficit/Hyperactivity Disorder (e.g., Montauk and Mayhall 2009). The findings in this study bear that out.

Attention ability at age 5 as measured in the NLSCY was significantly linked to attention ability at age 9. In a regression analysis, attention at age 5 accounted for 20% of the variance in attention at age 9. The pattern was similar for both girls and boys, and for children from families at all income levels. (Regression tables are available from Statistics Canada.)

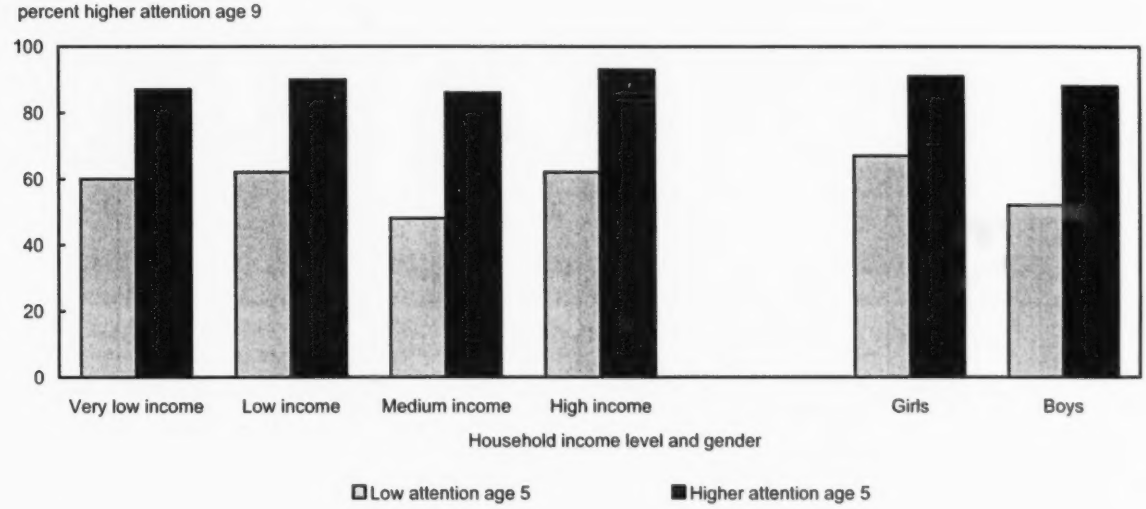
Chart 14 (Table L) presents the percentage of students who were rated higher in attention at age 9 according to their attention ability at age 5, separately for girls and boys, and for children from four family income levels.

4.7.4 Attention ability at age 5 and mathematics achievement at age 9

Linear regression procedures were used to determine whether attention at age 5 was linked to mathematics achievement at age 9. Because mathematics achievement at age 9 and attention ability at age 9 were linked (Chart 5; Table C), and attention ability at age 5 was a strong predictor of attention ability at age 9 (Chart 14; Table L), it was necessary to control for the effects of concurrent attention ability on mathematics achievement at age 9 in order

to determine whether there was a direct association between attention at age 5 and mathematics achievement at age 9. The regression analysis indicated that mathematics achievement at age 9 was not linked to attention ability at age 5, after attention ability at age 9 was accounted for. This was true for girls and boys and for children from very low income and higher income households. (Regression tables are available from Statistics Canada.)

Chart 14
Percent of children at age 9 who were high in attention according to attention level at age 5, by household income level and gender



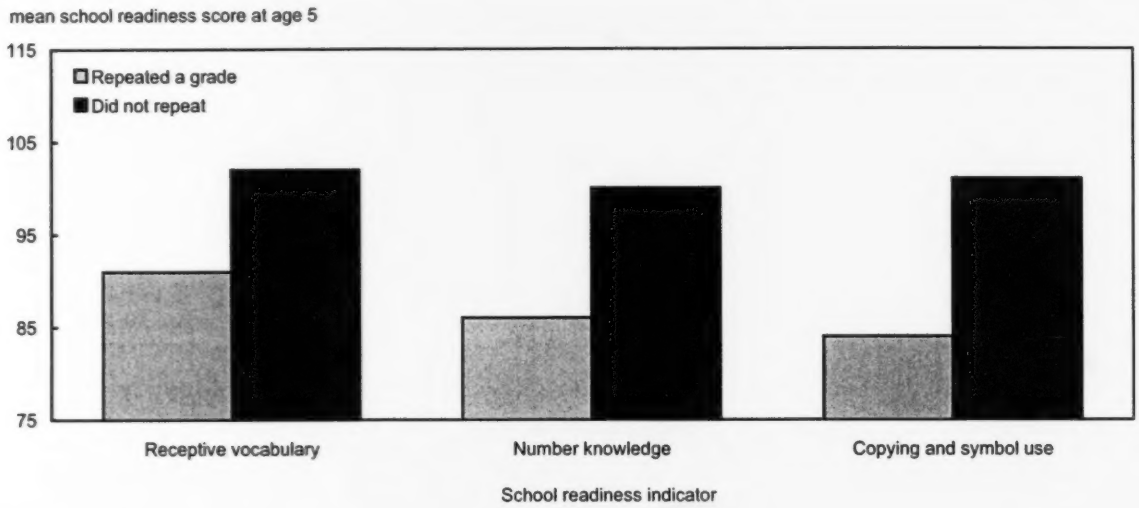
Note(s): Income levels are defined in Section 9.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2002/2003 and 2006/2007.

4.7.5 School readiness indicators at age 5 and repeating a grade, special education, and receiving tutoring or extra help

Low scores in number knowledge, copying and symbol use, and receptive vocabulary at age 5 were linked to repeating a grade by age 9 (Table M). This was true for girls and boys, and for children from low income and higher income families (data not provided). Chart 15 (Table M) shows the mean school readiness indicator scores at age 5 for children who had and had not repeated a grade by age 9.

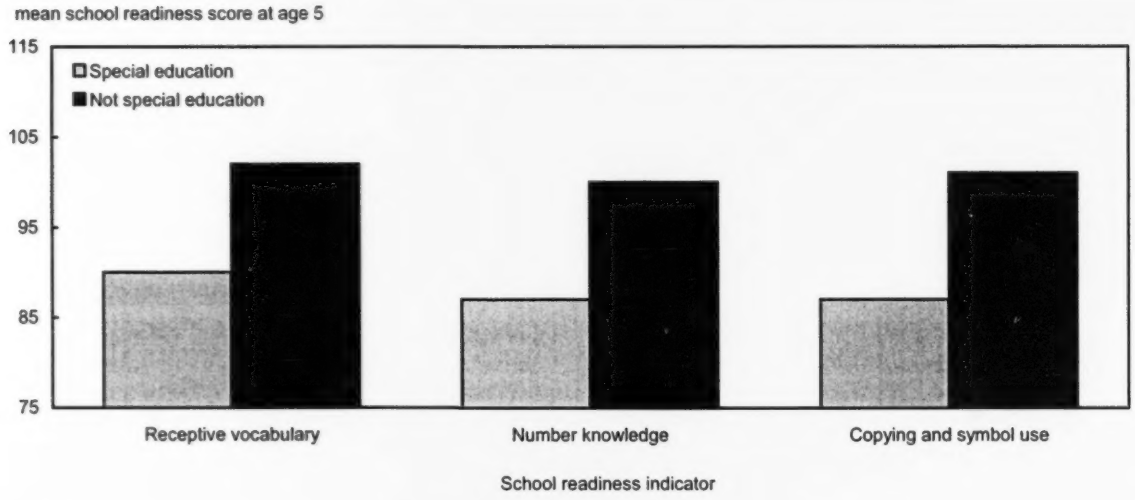
Patterns that were similar to these appeared for both participating in special education (Chart 16; Table M) and receiving tutoring or extra help (Chart 17; Table M) at age 9. Low scores on number knowledge, copying and symbol use, and receptive vocabulary at age 5 were significantly linked to participating in a special education program and to receiving tutoring or extra help.

Chart 15
Children at age 9 who had repeated a grade had lower mean school readiness scores 4 years earlier at age 5 than those who had not repeated a grade



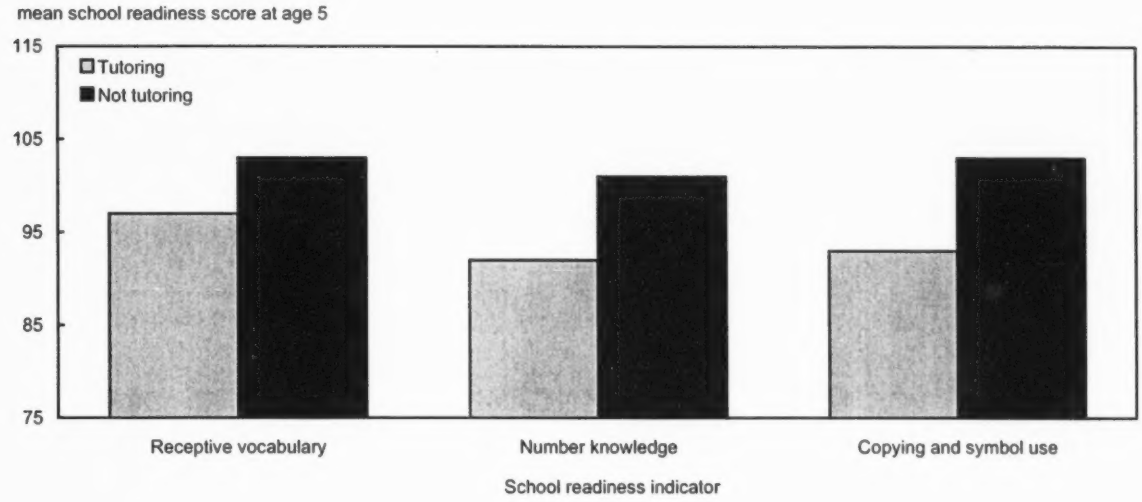
Note(s): Score of 75 corresponds to the lower 5th percentile of the school readiness score distributions.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2002/2003 and 2006/2007.

Chart 16
Children at age 9 who participated in special education programs had lower mean school readiness scores 4 years earlier at age 5 than those who had not participated in special education



Note(s): Score of 75 corresponds to the lower 5th percentile of the school readiness score distributions.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2002/2003 and 2006/2007.

Chart 17
Children at age 9 who received tutoring or extra help had lower mean school readiness scores 4 years earlier at age 5 than those who did not receive tutoring or extra help



Note(s): Score of 75 corresponds to the lower 5th percentile of the school readiness score distributions.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2002/2003 and 2006/2007.

4.7.6 Attention ability at age 5 and repeating a grade, special education, and receiving tutoring or extra help

As shown in Table 10, attention ability at age 5 was significantly linked to repeating a grade, participating in special education, and receiving tutoring or extra help by age 9. Students who were low in attention ability at age 5 were more likely to have repeated a grade than those who were higher in attention ability at age 5. The pattern was similar for participating in a special education and for receiving tutoring or extra help, with lower attention ability being linked to participation in both of these activities.

Because repeating a grade, and participating in special education programs or receiving tutoring or extra help were all linked to attention ability at age 9 (Table 5), and attention ability at age 5 was a strong predictor of attention ability at age 9 (Chart 14; Table L), a series of logistic regression analyses was completed to determine whether the link between attention at age 5 and these outcomes persisted when the effect of attention at age 9 was controlled. The analyses indicated that even after controlling for attention ability at age 9, low attention ability at age 5 was significantly linked to participation in a special education program four years later, but not to repeating a grade or receiving extra help or tutoring. (Regression tables are available from Statistics Canada.)

Table 10
Children at age 9 who had repeated a grade, participated in special education programs, or received tutoring or extra help for academic problems by attention ability level at age 5

	Repeated a grade		Special education program		Tutoring or extra help	
	percent	standard error	percent	standard error	percent	standard error
Attention ability at age 5						
Very low attention	7.6[1]	1.48	12.1[1]	1.94	31.0[1]	2.47
Higher attention	2.8	0.43	2.0	0.38	19.3	1.05

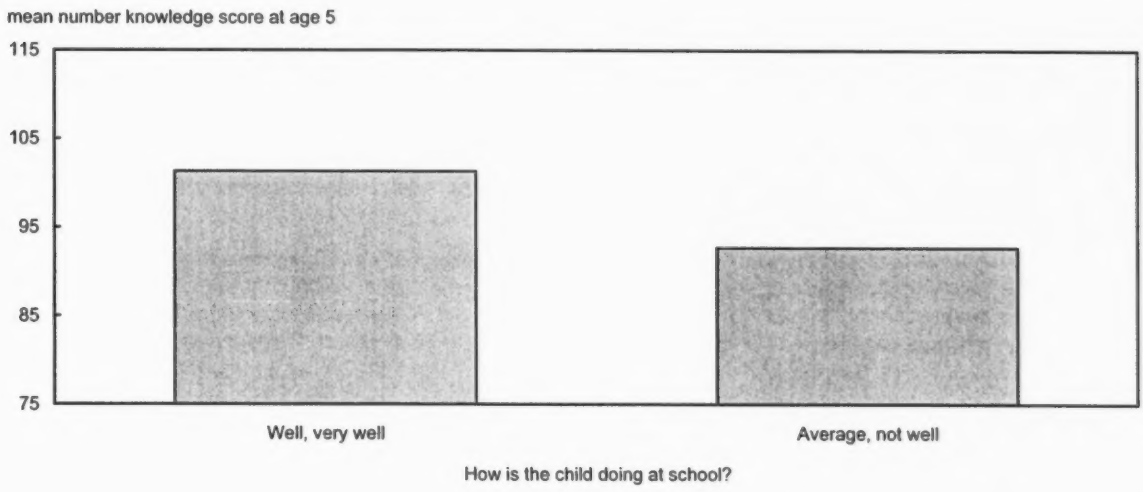
1. Statistically significant and substantive difference between levels.
Note(s): Statistical significance: p<0.01 for differences between levels. Substantive differences are defined as percentage differences of 5 points or more.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2002/2003 and 2006/2007.

4.7.7 School readiness indicators at age 5 and parent report of how well the child was doing at school

Number knowledge, copying and symbol use, and receptive vocabulary at age 5 were all significantly associated with parent report of how well the child was doing at school at age 9, both overall and separately for girls and boys. Charts 18 to 20 (Table N) show the mean school readiness scores at age 5 for children who were reported to be doing well or very well overall at age 9 compared with those who were reported to be doing average or poorly. Charts for copying and symbol use are presented separately for girls and boys because they differed significantly in this measure at age 5, but they did not differ in number knowledge or receptive vocabulary at that age (Thomas 2006).

Because parent report of how the child was doing at school was linked to mathematics achievement at age 9 (Chart 7; Table C), and the indicators of school readiness at age 5 were also linked to mathematics achievement at age 9 (Chart 13; Table K), a series of logistic regression analyses was undertaken to determine whether number knowledge, copying and symbol use, and receptive vocabulary at age 5 each accounted for significant variance in parent report of how the child was doing overall at age 9, after accounting for mathematics achievement at age 9. The analyses indicated that after controlling for mathematics achievement at age 9, the school readiness indicators at age 5 were significantly linked to parent report of how the child was doing four years later. (Regression tables are available from Statistics Canada.) Most of these patterns were found for both girls and boys in both grade 3 and grade 4. The sole exception was receptive vocabulary for girls in grade 3, where the pattern was similar but low numbers meant that the independent variance explained did not reach statistical significance. (Regression tables are available from Statistics Canada.)

Chart 18
Mean number knowledge score at age 5 for children who were doing well or not well at school at age 9



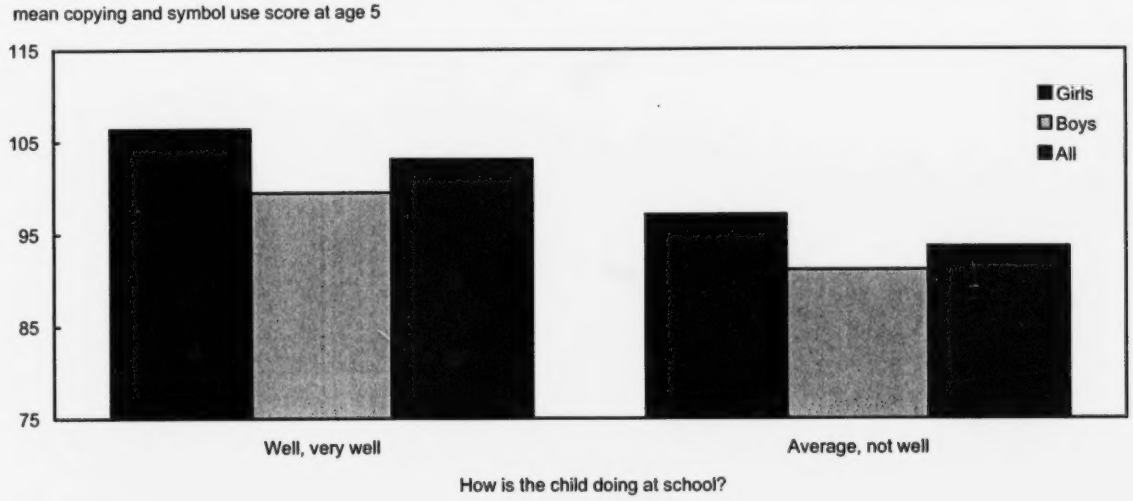
Note(s): Score of 75 corresponds to the lower 5th percentile of the number knowledge score distribution for all 5-year-olds at cycle 5 (2002/2003).
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2002/2003 and 2006/2007.

4.8 School readiness indicators, school achievement and education environment

The final research question investigated in this report asked whether the education environments of children modified the links between their school readiness indicators at age 5 and their school achievement at age 9. To address this question, the analysis focused on number knowledge at age 5 as the school readiness indicator and mathematics achievement at age 9 as the school achievement measure. Six education environment measures were considered. A series of multivariate regression models was generated for the mathematics test scores of students in grade 3 and in grade 4. The models included as predictor variables the number knowledge score at age 5, the six education environment variables, and household income level. Gender was not included as a predictor in these models because it was not linked to mathematics test score, number knowledge, or the education environment variables.

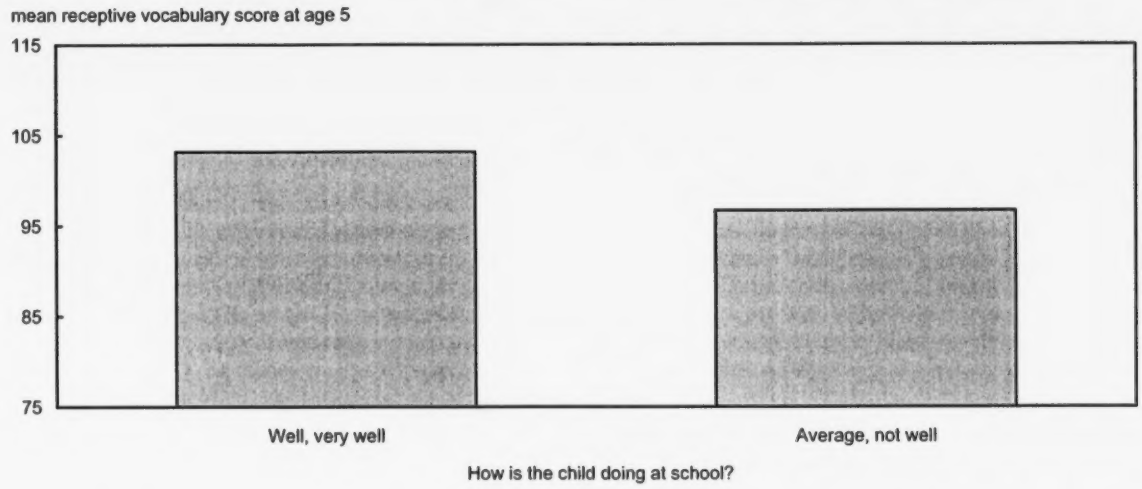
In the Model 1 for each grade, number knowledge was tested alone. As shown in Table 11 (grade 3) and Table 12 (grade 4), number knowledge at age 5 was a significant predictor of mathematics achievement at age 9, accounting for 14.4% of the variance in the mathematics test score for grade 3 students and 5.8% for grade 4 students. In Model 2 for each grade, the six education environment variables were tested, with household income included as a control variable. These variables considered together accounted for 4.9% (grade 3) and 1.6% (grade 4) of the variance in the mathematics test score. In Model 3, number knowledge was added to the Model 2 variables. The full model accounted for 17.5% and 7.0% of the variance in the mathematics test score. For both grades, number knowledge at age 5 was significantly associated with mathematics achievement, even when the effects of education environment and household income were controlled.

Chart 19
Mean copying and symbol use scores at age 5 for children who were doing well or not well at school at age 9



Note(s): Score of 75 corresponds to the lower 5th percentile of the copying and symbol use score distribution for all 5-year-old children in cycle 5 of the NLSCY.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2002/2003 and 2006/2007.

Chart 20
Mean receptive vocabulary scores at age 5 for children who were doing well or not well at school at age 9



Note(s): Score of 75 corresponds to the lower 5th percentile of the receptive vocabulary score distribution for all 5-year-olds at cycle 5.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2002/2003 and 2006/2007.

Table 11
Mathematics test score at age 9 for grade 3 students predicted by number knowledge score at age 5, household income level, and education environment variables

	Mathematics test score								
	Model 1			Model 2			Model 3		
	regression coefficient	standard error	p-value	regression coefficient	standard error	p-value	regression coefficient	standard error	p-value
Intercept	215.6	17.98	0.000	338.6	6.92	0.000	220.5	21.42	0.000
Number knowledge score at age 5	**1.26**	**0.19**	**0.000**	...	...	...	**1.23**	**0.21**	**0.000**
Household income level									
Below the low income cut-off	...	...	...	-11.20	8.09	0.166	-8.15	8.24	0.323
At or above the low income cut-off [1]	...	...	...	0.00	0.00	...	0.00	0.00	...
Education environment variables									
Importance of good grades									
Not important	...	...	...	-16.48	10.12	0.104	-12.06	8.92	0.177
Important	...	...	...	-1.89	6.33	0.766	0.38	6.04	0.949
Very important [1]	...	...	...	0.00	0.00	...	0.00	0.00	...
Parent talks about school work, behaviour									
Once per week or less	...	...	...	-10.78	9.67	0.265	-13.23	8.65	0.126
A few times per week	...	...	...	-6.30	7.58	0.406	-6.79	7.24	0.348
Daily [1]	...	...	...	0.00	0.00	...	0.00	0.00	...
Parent talks about friends, activities									
Once per week or less	...	...	...	6.58	14.97	0.660	6.35	13.46	0.638
A few times per week	...	...	...	1.79	8.52	0.833	1.62	7.87	0.837
Daily [1]	...	...	...	0.00	0.00	...	0.00	0.00	...
Parent checks homework									
Once per week or less	...	...	...	22.08	9.33	0.018	15.78	7.48	0.035
A few times per week	...	...	...	5.34	10.80	0.621	5.82	9.06	0.521
Daily [1]	...	...	...	0.00	0.00	...	0.00	0.00	...
Parent participates at school									
Three or fewer school activities	...	...	...	0.72	7.47	0.924	6.52	7.43	0.381
Four or more school activities [1]	...	...	...	0.00	0.00	...	0.00	0.00	...
Positive school climate score									
Below median	...	...	...	-8.01	5.93	0.177	-4.74	5.69	0.405
Above median [1]	...	...	...	0.00	0.00	...	0.00	0.00	...

	Model 1	Model 2	Model 3
R^2 for model	**0.144**	**0.049**	**0.175**

1. Reference category.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2002/2003 and 2006/2007.

Table 12
Mathematics test score at age 9 for grade 4 students predicted by number knowledge score at age 5, household income level, and education environment variables

	Mathematics test score								
	Model 1			Model 2			Model 3		
	regression coefficient	standard error	p-value	regression coefficient	standard error	p-value	regression coefficient	standard error	p-value
Intercept	282.8	8.88	0.000	372.1	2.55	0.000	228.8	9.03	0.000
Number knowledge score at age 5	**0.89**	**0.09**	**0.000**	...	...	...	**0.87**	**0.09**	**0.000**
Household income level									
Below the low income cut-off	...	...	...	-7.64	5.11	0.135	-3.64	4.80	0.447
At or above the low income cut-off [1]	...	...	...	0.00	0.00	...	0.00	0.00	...
Education environment variables									
Importance of good grades									
Not important	...	...	...	-10.77	5.86	0.066	-8.30	5.73	0.147
Important	...	...	...	-0.53	3.17	0.867	1.08	2.97	0.715
Very important [1]	...	...	...	0.00	0.00	...	0.00	0.00	...
Parent talks about school work, behaviour									
Once per week or less	...	...	...	-6.17	5.42	0.255	-7.98	5.04	0.114
A few times per week	...	...	...	4.24	3.53	0.230	4.30	3.46	0.214
Daily [1]	...	...	...	0.00	0.00	...	0.00	0.00	...
Parent talks about friends, activities									
Once per week or less	...	...	...	-10.26	7.94	0.197	-5.47	7.33	0.456
A few times per week	...	...	...	2.10	3.79	0.580	3.06	3.71	0.410
Daily [1]	...	...	...	0.00	0.00	...	0.00	0.00	...
Parent checks homework									
Once per week or less	...	...	...	6.73	4.18	0.107	4.27	4.06	0.293
A few times per week	...	...	...	5.03	3.15	0.111	4.11	3.08	0.182
Daily [1]	...	...	...	0.00	0.00	...	0.00	0.00	...
Parent participates at school									
Three or fewer school activities	...	...	...	1.98	4.10	0.629	3.50	3.99	0.380
Four or more school activities [1]	...	...	...	0.00	0.00	...	0.00	0.00	...
Positive school climate score									
Below median	...	...	...	-2.61	2.84	0.358	-1.65	2.77	0.553
Above median [1]	...	...	...	0.00	0.00	...	0.00	0.00	...

	Model 1	Model 2	Model 3
R^2 for model	**0.058**	**0.016**	**0.070**

1. Reference category.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2002/2003 and 2006/2007.

Note that none of the education environment variables or household income predicted significant variance in mathematics achievement when all of these variables and number knowledge at age 5 were included in the regression equations. Parent involvement with homework continued to be marginally linked to mathematics achievement for grade 3 students, as discussed earlier.

5 Conclusions

This project addressed a set of research questions about the school achievement and the education environments of 9-year-old Canadian children. The project also looked back at the skills they brought with them when they entered school four years earlier at age 5, and linked these to their school achievement at age 9. Results for the research questions are presented below.

Are there differences in the school achievement of Canadian 9-year-olds depending on the sex of the child, family income level, and province of residence?

Similarities and differences that were found between demographic groups in school achievement in this study were consistent with those reported in the research literature.

Sex differences appeared for most of the school achievement variables studied. While girls and boys did not differ in mathematics achievement, girls were rated higher than boys in attention ability, and were more likely to be reported by their parents as doing well at school overall and in reading and written work. Girls were less likely than boys to receive tutoring or extra help for academic problems.

Children from very low income households tended to have lower achievement than more affluent children on most measures, but many of these differences were not large enough to reach statistical significance. A higher percentage of very low income children than higher income children had repeated a grade. More children from very low income households had parents who reported that they were not doing well at school than did children from higher income households.

Significant differences between the provinces appeared in mathematics achievement but not in other outcome variables, where these were tested.

Patterns of school achievement among Canadian 9-year-olds

Links were found among many of the school achievement measures. Students who were doing well in one domain, such as mathematics achievement, tended to be doing well in all of the other domains.

Attention skill was associated with most of the other outcomes, including mathematics ability and parent report of how they were doing at school in all subjects. Those with higher attention skills were less likely than others to have repeated a grade, to be participating in special education, or to be receiving tutoring or extra help for academic problems.

Repeating a grade, participating in special education, and receiving extra help or tutoring for academic problems tended to occur together. Also, a higher percentage of children in these situations had parents who reported that they were not doing well at school than did other children.

Are there differences in the education environments of 9-year-old students depending on the sex of the child, family income level, and province of residence?

Few differences appeared between girls and boys or between income groups in their education environments.

Overall, 9-year-old children had parents who valued good grades at school, and were optimistic about the future education attainments of their children. Income level differences appeared for education aspirations: A lower percentage of children from very low income families than from higher income families had parents who expected them to attend university.

Children living in smaller communities were less likely than those in large urban centres to have parents who hoped that they would attend university, a finding that may be linked to the availability of post-secondary education options in their communities, as suggested by reports on university attendance (Frenette 2004, 2007).

Most 9-year-olds had parents who were actively involved in their children's schooling, talking with their children daily about school work and school friends, monitoring homework, and participating in activities at their children's school.

At age 9, school children varied considerably in the frequency with which they were assigned homework, with more than half of them having daily homework, but 15% having homework once a week or less. Substantial differences in the frequency of daily homework appeared among the ten provinces.

Are the education environments of 9-year-olds linked to their school achievement?

The question about education environments and school achievement was addressed by looking at mathematics achievement as the school outcome. More frequent parental monitoring of homework was linked to lower mathematics test scores for grade 3 students, consistent with reports in the research literature that suggest that parents spend time helping a struggling child with homework (Shumow and Miller 2001). Few other links were found between the education environment variables and mathematics test scores in the present study.

To what extent are school readiness indicators at age 5 associated with school achievement at age 9? Are there differences in these links depending on the sex of the child, family income level, and province of residence?

School readiness indicators at age 5 were significantly related to school achievement at age 9 for both girls and boys, and for very low income and higher income families.

Nine-year-old children who had higher number knowledge scores, copying and symbol use scores, and receptive vocabulary scores at age 5 had significantly higher mathematics achievement at age 9 than those with lower scores, and were less likely to have repeated a grade, or to be enrolled in special education or in tutoring programs for academic problems. These patterns held equally for girls and boys and for children from both low income and higher income families.

Provincial differences both in mathematics achievement at age 9 and in number knowledge at age 5 were reported, but the patterns were not identical. In seven provinces where most 5-year-olds attended formal school, early number knowledge was significantly linked to later mathematics achievement. In the three provinces where fewer children were in formal schools at age 5, that is, Prince Edward Island, Nova Scotia and Quebec, the link between number knowledge and mathematics achievement was not found.

Attention ability at age 5 was significantly linked to attention ability at age 9. In a regression analysis, attention at age 5 accounted for 20% of the variance in attention at age 9. Attention ability at age 5 was not linked to mathematics achievement at age 9, to repeating a grade, or to receiving extra help or tutoring for academic problems, once attention ability at age 9 was controlled. Participation in special education at age 9 was the single school outcome variable that was associated with early attention ability after accounting for age 9 attention ability. These patterns were found for girls and boys and for children from very low income and higher income households.

Do the education environments of children modify the links between their school readiness indicators at age 5 and their school achievement at age 9?

The final research question addressed in this study investigated whether factors in the home and school, that is, the education environment, modified the links between school readiness indicators at age 5 and school achievement at age 9. To address this question, number knowledge at age 5 was used as the school readiness indicator and mathematics achievement at age 9 as the school outcome measure. After accounting for household income level, and for all of the education environment variables, the association between number knowledge at age 5 and mathematics achievement at age 9 remained significant and substantial. On the other hand, none of the education environment variables was significantly linked to mathematics achievement at age 9 when number knowledge at age 5 was controlled.

These findings are consistent with the research literature reported earlier showing that early school readiness skills are important predictors of later school success (e.g., Ramey et al. 2000; Reynolds and Temple 1998). The present results do not support the findings of some researchers that parental involvement in schooling is linked to achievement (e.g., EQAO 1997; Gregory and Weinstein 2004; Paulson, Marchant and Rothlisberg 1998; Shumow and Miller 2001; Spera 2006). However, research findings linking parent involvement in the child's schooling with outcomes have been contradictory (Shumow and Miller 2001). The inconsistency found here may be due in part to differences in how parent involvement was defined, and in part to the outcome measures used, as discussed earlier.

6 Summary and discussion

The transition between the primary grades 1 to 3 and the junior grades 4 to 6 in elementary school is an important one. The academic program changes from a skills-based one in the primary grades, emphasizing literacy, numeracy and other basic skills, to a subject-based curriculum in the junior grades that assumes that these basic skills are largely in place. The present study used data from the NLSCY to provide a picture of Canadian children at this significant stage in their school careers. This report presents an overview of the school circumstances of Canadian 9-year-old children, including their school achievement, their education environments at home and at school, and the cognitive aspects of their readiness for school as measured at age 5.

Children were found to vary widely in their academic achievement, and some of these variations were linked to their gender, their family income level, and their province of residence. Mathematics achievement at age 9 was significantly linked to number knowledge four years earlier. Marked differences were also found in the education environments of children, linked most consistently to family income levels. These findings add to what we know about children as they enter the junior grades at school.

Surveys cannot provide reasons or supply answers to questions about causes. What they can do is identify patterns and trends in the data and identify themes that may warrant further consideration. Among the many topics covered in the study reported here, three themes may be of particular interest to those concerned with the education of children: 1) the significance of school readiness; 2) the importance of attention ability in educational development; and 3) the nature and possible implications of children's educational environments.

1. Children who scored highest on indicators of school readiness at age 5 were those who scored highest on achievement at age 9, regardless of child gender or the income level of the child's family. Identifying factors that promote early school readiness and activities that might help to augment school readiness may lead to a clearer understanding of the patterns observed in this report

2. Children's level of attention ability at age 5 tended to persist, and attention emerged as a fundamental skill that was linked to all aspects of academic achievement that were measured at age 9. At this age, children with lower levels of attention ability tended to have lower academic achievement than those with higher levels, and for some measures this effect was stronger for girls than for boys. This was not the case at age 5, when attention ability was not linked to school readiness as measured in this report. These findings indicate the complexity of the link between attention ability and academic performance. Further research into questions of when and how attention ability and other academic skills develop over the primary years and what factors impact attention ability could contribute to knowledge in this area

3. The education environments of children at home and at school were not linked to their academic outcomes as measured in this report, but the research literature suggests that these environments may be linked to other outcomes, besides the academic ones studied here. The present study did not examine literacy and reading outcomes, social outcomes such as relationships with family and friends, or behavioural outcomes, all of which may be linked to education environments. The education environments of children were found to differ widely in this study, suggesting that there might be value in investigating links between these environments and other kinds of outcomes.

Limitations of the study

Three major limitations of this study are summarized below.

Focus on age, not grade level. The population of children studied in this report included all 9-year-old children in Canada in 2006/2007. Because of provincial differences in the cut-off date for entry into the school system, and because a small percentage of children repeat grades, the 9-year-olds were not all at the same grade level. Most of them (84%) were in grade 4, some (15%) were in grade 3, and a small percentage were in other grades or were not in school. Because the sample of 9-year-olds does not include all children in either grade, the conclusions in this report do not refer to grade 3 or grade 4 children, but either to all 9-year-old children or to 9-year-old children in those grades, when the grades are considered separately.

Grade 4 is the transitional year between the primary and junior grades. It would be of interest to study the population of all children in that grade and to compare the achievement patterns of children in grade 3 and grade 4 using NLSCY data, to cast light on the transitional processes. It would not be possible to study the links between early school readiness and achievement in grade 3 and 4 in such a study, however, because school readiness measures are available only for those who were aged 4 and 5 in 2002/2003, and are not available for 10-year-olds in grade 4, who would have been 6 years of age at that time. Also, some children who were aged 4 and 5 in 2002/2003 for whom school readiness indicators are available would not be in grade 3 or grade 4 in 2006/2007. For these reasons, analyses of school readiness and academic outcomes using grade-level samples would be biased in unknown ways. A study of students in the 4 transition year is a topic for future research.

Restricted definition of school achievement and school readiness. A second limitation of this study arises from the aspects of school achievement and school readiness that were selected for examination. The focus here was on cognitive and academic dimensions of school outcomes and school readiness, rather than on social and emotional dimensions. Social outcomes, such as relationships with friends and family, and emotional and behavioural outcomes, such as aggression or depression, that are of fundamental importance in the development of children, were not considered in this report. Similarly, the concept of school readiness includes a broad range of dimensions, including health and physical development, emotional well-being and social competence, approaches to learning, communication skills, and cognition and general knowledge (NEGP 1997). The present report concentrated on the more cognitive aspects of readiness to learn, including indicators of cognition and general knowledge (number knowledge, and copying and using symbol), of communication skill (receptive vocabulary), and of approaches to learning (attention ability), leaving a consideration of the social and emotional aspects to future research projects.

Topics covered and questions asked in the survey. The third major limitation of this study arises from the nature of the survey itself. The NLSCY was designed to collect information about Canadian children on a broad range of topics including health, physical development, learning, behaviour, family, friends, schools and communities. Because it covers so much territory, a limited number of questions can be asked on any one topic, and some topics cannot be covered at all. For example, there is no measure of reading ability for the children in grade 3 and 4 in 2006/2007, so one of the most important academic outcomes at this grade level cannot be assessed. Also, no information is collected about attitudes and opinions from the students themselves in this age group, so important outcome measures like engagement at school are not available. The wording of some questions is not ideal and some of the questions cover more than a single concept. For example, the question about parent involvement with homework asks if the parent checks homework or provides help with homework, two quite different activities. Finally, except for the direct tests of number knowledge, copying and using symbols, receptive vocabulary, and mathematics achievement, all of the measures for this age group rely on parent report. The potential biases that parent report may introduce into the analyses are unknown. When considering links between two or more variables that are based on parent report, correlations are likely, but the direction and extent of this kind of error cannot be determined, and it is not known whether the biases would vary between demographic groups.

These limitations should be kept in mind when considering the findings of this study. However, this report provides information and identifies questions that may be useful for educators, researchers, program and policy planners, and parents themselves as they work toward providing the best possible education outcomes for school children.

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8 The National Longitudinal Survey of Children and Youth

The National Longitudinal Survey of Children and Youth (NLSCY) is a long-term study of Canadian children that follows their development from birth to early adulthood. The NLSCY began in 1994, and is conducted by Statistics Canada. The survey is sponsored by Human Resources and Skills Development Canada. The survey is designed to collect information about factors influencing the social, emotional and behavioural development of children, and to monitor the impact of these factors on their development over time. The survey covers a broad range of topics including health, physical development, learning, behaviour, and social environment (family, friends, schools and communities).

Survey design. The NLSCY sample frame in the first cycle of the survey, in 1994/1995, was based on the Labour Force Survey (LFS), a monthly survey of households in Canada conducted by Statistics Canada. Households with children aged 0 to 11 years were selected from the LFS in 1994 to participate in the NLSCY. Of 26,000 eligible households, 23,000 responded.

The first cycle of the NLSCY was conducted in 1994 and early 1995. The longitudinal cohort from that cycle has been monitored every two years since then, with data collection taking place in 1994/1995, 1996/1997, 1998/1999, 2000/2001, 2002/2003, 2004/2005, and 2006/2007. New panels of children have been added to the survey each year. For information about changes to the sample frame over that time, the reader is referred to the Microdata User Guide for cycle 7 (Statistics Canada n.d.b).

The present sample. The sample of children studied here included 9-year-old children in the third longitudinal cohort of the NLSCY. These children were born between April and December in 1997. They were 9 years old as of December 31, 2006, during the cycle 7 collection phase. Of the 4,916 children born in 1997 who were recruited in cycle 3 as one-year-olds, 3,923 responded in cycle 5 at the age of 5 years, when school readiness was measured, for a retention rate of 79.8%. Of these children, 3,379 responded in cycle 7 at the age of 9 years while 544 did not respond, for a cycle 5 to cycle 7 retention rate of 86.1% and a cycle 3 to cycle 7 retention rate of 68.7%. These 3,379 children were included in the present analysis. Applying the cross-sectional survey design weights indicates that these children represented around 373,000 9-year-old children in the Canadian population in 2006.

Note that because of the sample selection procedure, no children who were born in the first four months of the year are included in the study; therefore, conclusions apply to a population of 9-year-olds that is relatively young.

Cycle 5 to cycle 7 attrition. An attrition analysis was undertaken to identify possible sources of bias caused by non-response. The 3,379 children who responded in cycle 7 and the 544 who did not respond were compared, in order to determine whether they differed in child and family characteristics, and in school readiness measures at cycle 5. The results of the analysis appear in Table 13.

As shown in the table, non-respondents and respondents did not differ in gender. However, a higher percentage of non-respondents than respondents came from low income households, had a parent with high school education or less, lived in a single parent family, had a parent who was born outside Canada, and lived in large urban centres. Non-respondents and respondents at age 9 differed significantly in how ready they were for school four years earlier, at age 5. Non-respondents scored lower than respondents in receptive vocabulary and number knowledge at age 5. These trends may bias the findings of this study in unknown ways, and must be considered when interpreting the findings of the present report.

Partial non-response. Response rates for most outcome variables that were provided by the reporting parent were over 97%. These variables included all parent-report outcome measures and all educational environment variables except the positive school climate score, which had a response rate of 91%. Because partial non-response was so low for these variables, its effect on findings would be small, and it was ignored in the analyses.

Direct measures used in this report included the Peabody Picture Vocabulary Test – Revised (PPVT-R; receptive vocabulary score), the Number Knowledge Assessment (number knowledge score), and Who Am I? (copying and symbol use score) at age 5, and the Mathematics Computation Exercise (mathematics test score) at age 9. Response rates for the direct measures were lower than for parent-reported measures, for various reasons. The percentage of the 3,379 9-year-old respondents for whom scores were available for the direct measures at age 5 and age 9 were:

Receptive vocabulary score (age 5)	91%
Number knowledge score (age 5)	91%
Copying and symbol use score (age 5)	87%
Mathematics test score (age 9)	89%

A discussion of reasons for partial non-response and a detailed analysis of non-response for each of these measures is reported in the Microdata User Guide for cycle 7 (Statistics Canada n.d.b, p. 120-121).

For each of the direct measures, the children who responded were compared with the non-respondents, in order to determine whether they differed in child and family characteristics in ways that might bias interpretation of the findings of the study. The results of these comparisons appear in Table 14 and Table 15.

The non-response analysis found that partial non-response for the receptive vocabulary score was linked to parent education, parent country of birth, and region of residence. Response rates were significantly and substantively higher for children whose parents had post-secondary education, whose parents were born in Canada, and who resided in the Atlantic region or Québec compared with Ontario (Table 14 and Table 15).

Partial non-response for the number knowledge score was linked to parent education, parent country of birth, and region of residence. Response rates were significantly and substantively higher for children whose parents had post-secondary education, whose parents were born in Canada, and who resided in the Atlantic region compared with Ontario (Table 14 and Table 15).

Partial non-response for the copying and symbol use score was linked to parent education. Response rates were significantly and substantively higher for children whose parents had post-secondary education (Table 14).

Partial non-response for the mathematics test score was linked to household income and region of residence. Response rates were significantly and substantively higher for children in households with higher income levels (Table 14), and for children who resided in the Atlantic region or Québec compared with the Prairie region or British Columbia (Table 15).

These trends may bias the findings of this study in unknown ways, and must be taken into account when interpreting the findings in the present report.

Table 13
Demographic characteristics and school readiness indicators at cycle 5 of respondents and non-respondents to the survey at cycle 7

	Non-respondents at cycle 7	Respondents at cycle 7
	percent	
Demographic characteristics at cycle 5 (number)	**544**	**3,379**
Boys	51.6	51.1
Low income	24.2 [1]	14.9
Parent education high school or less	46.7 [1]	33.7
Single parent family	26.5 [1]	13.4
Parent born outside Canada	28.4 [1]	20.2
Community size [2]		
Rural	8.3	10.9
Less than 30,000	20.1	23.8
30,000 to less than 100,000	8.2	10.4
100,000 to less than 500,000	12.0	13.8
500,000 or more	51.5 [1]	42.0
Region [3]		
Atlantic	5.3	7.0
Quebec	21.6	22.2
Ontario	36.8	42.1
Prairie	19.4	17.3
British Columbia	17.0 [1]	11.4
School readiness indicators cycle 5		
Receptive vocabulary score below median	65.0 [1]	48.1
Number knowledge score below median	59.2 [1]	48.7
Copying and symbol use score below median	56.2	50.4

1. Statistically significant difference between non-respondents and respondents, $p<0.01$.
2. Overall chi square = 2.9, 4df, p=0.021.
3. Overall chi square = 4.64, 4df, p=0.001.

Note(s): Substantive differences are defined as percentage differences of 5 points or more. Cycle 5 cross-sectional weights and cross-sectional bootstrap weights for variance estimation were used for these non-response analyses.

Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2002/2003 and 2006/2007.

Table 14

Response rates of cycle 7 respondents for school readiness indicators at cycle 5 and for mathematics test score at cycle 7, by child and family characteristics

	Receptive vocabulary score cycle 5 [1]	Number knowledge score cycle 5 [1]	Who Am I? score cycle 5 [2]	Mathematics test score cycle 7 [3]
	percent			
Overall response rate	**91**	**91**	**87**	**89**
Gender				
Girls	93	93	89	90
Boys	89	89	86	87
Income status				
Very low income	86	86	84	80
Higher income	91	92	88	90
Income level				
Below low income cut-off	86	86	84	80
Low income cut-off to less than 2 times low income cut-off	90	90	86	89
Two times to less than 3 times low income cut-off	92	93	89	88
Three times low income cut-off or above	93	93	90	93
Parent education level				
High school or less	86	86	82	86
More than high school	93	93	90	90
Family structure				
One-parent family	90	90	85	84
Two-parent family	91	91	88	89
Country of birth of parent				
Not Canada	87	87	86	89
Canada	92	93	88	89

1. Response rate for this measure was significantly higher statistically and substantively for those with more educated parents and for those with parents born in Canada.
2. Response rate for this measure was significantly higher statistically and substantively for those with more educated parents.
3. Response rate for this measure was significantly higher statistically and substantively for children in high income families.

Note(s): Statistical significance: $p<0.01$ for differences between levels. Substantive differences are defined as percentage differences of 5 points or more. Cycle 7 cross-sectional weights and cross-sectional bootstrap weights for variance estimation were used for these non-response analyses.

Source: Statistics Canada: National Longitudinal Survey of Children and Youth 2002/2003 and 2006/2007.

Table 15

Response rates of cycle 7 respondents for school readiness indicators at cycle 5 and for mathematics test score at cycle 7, by geographic characteristics

	Receptive vocabulary score cycle 5 [1]	Number knowledge score cycle 5 [1]	Who Am I? score cycle 5 [2]	Mathematics test score cycle 7 [3]
	percent			
Overall response rate	**91**	**91**	**87**	**89**
Community size				
Rural	90	90	87	86
Under 30,000	95	94	91	91
30,000 to under 100,000	93	93	91	86
100,000 to under 500,000	92	92	89	89
500,000 and over	89	89	85	89
Region of residence				
Atlantic	94	94	90	93
Quebec	94	93	86	93
Ontario	88	88	87	89
Prairie	90	90	87	83
British Columbia	92	93	90	85

1. Response rate for this measure was significantly higher statistically and substantively for those in the Atlantic Region or Quebec compared with Ontario.
2. Response rate for this measure was significantly higher statistically and substantively for those in the Atlantic Region compared with Ontario.
3. Response rate for this measure was significantly higher statistically and substantively for those in the Atlantic Region and Quebec compared with the Prairie Region and British Columbia.

Note(s): Statistical significance: $p<0.01$ for differences between levels. Substantive differences are defined as percentage differences of 5 points or more. Cycle 7 cross-sectional weights and cross-sectional bootstrap weights for variance estimation were used for these non-response analyses.

Source: Statistics Canada: National Longitudinal Survey of Children and Youth 2002/2003 and 2006/2007.

9 Definitions

9.1 Child and family characteristics (demographic variables)

Several child and family characteristics were included as predictor variables in the analyses. They included:

9.1.1 Gender of child

Girl or boy

9.1.2 Household income of child's home – two-level

Below low income cut-off (Very low income)

Low income cut-off and above (Higher income)

9.1.3 Household income of child's home – four-level

Below low income cut-off (Very low income)

Low income cut-off to less than 2 times low income cut-off (Low income)

Two times low income cut-off to less than 3 times low income cut-off (Medium income)

Three times low income cut-off or above (High income)

9.1.4 Education level of reporting parent

High school completion or less, or more than high school

9.1.5 Family structure

One-parent family or two-parent family

9.1.6 Country of birth of reporting parent

Not Canada or Canada

9.1.7 Community size

Rural

Population less than 30,000

Population 30,000 to less than 100,000

Population 100,000 to less than 500,000

Population 500,000 and over

9.1.8 Province of residence

Ten provinces

9.1.9 Household income status and low income cut-offs

Income status was measured using the income ratio variable in the data set, which is the ratio of household income to the low income cut-off as reported by Statistics Canada for the size and location of the child's household. The following information on the income ratio variable was taken from the *Microdata User Guide* of the NLSCY for cycle 1 (Statistics Canada n.d.a).

NLSCY children can be classified as living in households of various income levels. An income ratio has been derived and assigned to each child record and can be used for analytical purposes to further understand the economic situation of the child. The following is a description of how this ratio was calculated. Every year Statistics Canada establishes what are known as the low-income cut-offs, which are derived by considering expenditure to income patterns observed in the most recent Family Expenditure Survey. These thresholds or values are calculated for different urban-size and family-size categories and are updated annually using the Consumer Price Index. The cut-offs that were derived for 1994 were used to calculate the NLSCY income ratio. The ratio was simply calculated to be the household income divided by the cut-off value (p. 63-64).

Similar procedures were used to calculate the NLSCY income ratio for 2006. Readers who require additional information on data quality issues related to the income ratio are referred to the *Microdata User Guide* for the NLSCY for cycle 1 or cycle 7 (Statistics Canada n.d.a, n.d.b).

9.2 Measures of school achievement

Mathematics test score. Mathematics achievement at age 9 was assessed using a shortened version of the Mathematics Computation Test of the standardized Canadian Achievement Tests, Second Edition. More information about the Mathematics Computation Exercise in the NLSCY may be found in the Microdata User Guide for the NLSCY for cycle 7, page 152-154 (Statistics Canada n.d.b).

The test was designed to measure knowledge normally acquired in school. Because they had one year less instruction, the mathematics test scores of students in grade 3 were lower than those in grade 4, and some of the questions asked differed. For these reasons, analyses in this report using mathematics test scores were undertaken separately for students in grade 3 and 4.

Attention ability at age 9. The attention score for 9-year olds at cycle 7 included responses to a set of five individual items. The Cronbach's alpha measure of internal reliability for this score was 0.82. Parents were asked:

How often would you say that (CHILD):

1. *Can't sit still or is restless?*
2. *Is easily distracted, has trouble sticking to any activity?*
3. *Can't concentrate, can't pay attention for long?*
4. *Is inattentive?*
5. *Can not settle on anything for more than a few moments?*

Response options were: *never or not true, sometimes or somewhat true*, and *often or very true*. Responses were scored 2 for *never or not true*, 1 for *sometimes or somewhat true*, and 0 for *often or very true*.

Possible scores for attention ability at age 9 ranged from 0 (low attention score) to 10 (high attention score).

For some analyses, attention ability at age 9 was analyzed as a two-level variable, low attention ability (at or below the 15th percentile score of 4) and higher attention ability (above the 15th percentile score, that is, 5 or higher). Where cell numbers were low, attention ability at age 9 was analyzed as a two-level variable with a cut-off at the 25th percentile. Where this condition applies, the cut-off is indicated in the chart and text.

Repeating a grade. Parents were asked:

Has this child ever repeated a grade (including kindergarten)?

Responses were *yes* or *no* for this question.

Participating in a special education program for academic problems. Participating in a special education program for academic problems was based on the parent's response to the following series of questions:

Is this child enrolled in an academic program with a specially designed curriculum other than a language immersion program (for example, a special education program, a program for gifted students, English or French as a second language)?

If *yes*, the parent was asked:

What type of academic program is this child enrolled in: School program for special needs students such as special education (excluding hearing or visually impaired students)?

If *yes* to this option, the child was coded as participating in a special education program for academic problems. If the child was not enrolled in a special education program, or was enrolled in a different type of program (e.g., a gifted program), the child was coded as not participating in a special education program for academic problems.

Receiving tutoring or extra help for academic problems. Receiving tutoring or extra help for academic problems was based on the parent's response to the following questions:

During the previous school year, did this child receive any additional help or tutoring?

If *yes*, the parent was asked:

What was the main reason this child was receiving additional help or tutoring:

A learning disability/difficulty?

Poor academic performance?

If *yes* to either of these options, the child was coded as receiving tutoring or extra help for academic problems. If the child did not receive additional help or tutoring or received additional help or tutoring for a different reason (e.g., an emotional problem), the child was coded as not receiving extra help or tutoring for academic problems.

Parent report of how well the child was doing at school. Parents were asked a series of questions about how the child was doing at school:

Based on your knowledge of his/her school work, including his/her report cards, how is this child doing in the following areas at school this year:

Reading?

Mathematics?

Written work such as composition?

How is he/she doing overall?

Response options were: *very well, well, average, poorly, very poorly.*

How well the child was doing at school in each subject and overall were analyzed as two-level variables: well (well or very well), and not well (average, poorly, very poorly).

9.3 Measures of the education environment at age 9

Parent attitudes: Importance of good grades at school. This variable was based on the parent's response to the following question:

How important is it to you that this child have good grades in school?

Response options were: *very important, important, somewhat important, not at all important.*

This variable was analyzed as a three-level variable: not or somewhat important, important, very important.

Parent attitudes: Education aspirations for the child. This variable was based on the parent's response to the following question:

How far do you hope this child will go in school?

Response options were:

primary/secondary school

secondary or high school

community college, CEGEP, or nursing school

trade, technical or vocational school, or business college

university

post-secondary (unspecified)

other

For some analyses, this variable was examined as a four-category variable:

university

other post-secondary

community college, CEGEP, nursing school

other (including all other options)

Frequency of parent talking to the child about school work and behaviour. This variable was based on the parent's response to the following question:

How often do you and this child talk about school work or behaviour in class?

Response options were: *daily; a few times a week; once a week; a few times a month; once a month; less than once a month; rarely.*

This variable was analyzed as a three-level variable: once per week or less; a few times a week; daily.

Frequency of parent talking to the child about friends and activities. This variable was based on the parent's response to the following question:

How often do you and this child talk about his/her school friends or activities?

Response options were: *daily; a few times a week; once a week; a few times a month; once a month; less than once a month; rarely.*

This variable was analyzed as a three-level variable: once per week or less; a few times a week; daily.

Frequency of homework. This variable was based on the parent's response to the following question:

How often is this child assigned homework?

Response options were: *never;less than once a month; once a month; a few times a month; once a week; a few times a week; daily.*

For some analyses, this variable was examined as a two-level variable: not daily homework and daily homework.

Parent checking or helping with homework. Parents whose children were ever assigned homework were asked:

How often do you check his/her homework or provide help with homework?

Response options were: *never or rarely; less than once a month; once a month; a few times a month; once a week; a few times a week; daily.*

This variable was analyzed as a three-level variable: once per week or less (including those who were never assigned homework); a few times per week; daily.

Parent participation in the child's school. The score for parent participation in the child's school included responses to a set of seven individual items. The Cronbach's alpha measure of internal reliability for this score was 0.62. Parents were asked:

During the past school year, did you do any of the following?

1. *Speak to, correspond or visit this child's teacher*
2. *Visit this child's class*
3. *Attend a school event in which this child participated (for example, a play, sports competition or science fair)*
4. *Volunteer in this child's class or help with class trip*
5. *Help elsewhere in the school, such as in the library or computer room*
6. *Attend a parent-school meeting*
7. *Participate in fund-raising for the school*
8. *Participate in other school activities*

Response options were *yes* or *no* for these activities. Responses were scored 0 for no and 1 for yes. This variable was examined as a two-level variable: fewer than four activities, and four or more activities.

Positive school climate. The score for the positive school climate in the child's school included responses to a set of five individual items. The Cronbach's alpha measure of internal reliability for this score was 0.84. Parents were asked:

The following are possible descriptions of his/her school. Please indicate whether you strongly agree, agree, disagree, or strongly disagree with the following statements.

1. *Academic progress is very important at this school.*
2. *Most children in this school enjoy being there.*
3. *Parents are made to feel welcome in this school.*
4. *School spirit is very high.*
5. *This school offers parents many opportunities to be involved in school activities.*

Response options were: *strongly agree, agree, disagree, strongly disagree*. Responses were scored from 0 for *strongly disagree* to 3 for *strongly agree*. Possible scores ranged from 0 (low positive school climate) to 15 (high positive school climate). For some analyses, positive school climate was analyzed as a two-level variable, low positive climate score (below median score of 11) and higher positive school climate score (at or above median score of 11).

9.4 Indicators of school readiness at age 5

Number knowledge score. The measure of number knowledge at age 5 was the age-standardized score on the 22-question (30-item) Number Knowledge Assessment instrument. More information about the Number Knowledge Assessment instrument in the NLSCY may be found in the *Microdata User Guide* for the NLSCY for cycle 7, page 148-150 (Statistics Canada n.d.b).

For some analyses in this paper, number knowledge score was analyzed as a two-level variable, low number knowledge score (below the median) and higher number knowledge score (above the median).

Copying and symbol use score. The measure of copying and symbol use at age 5 was the standard score on *Who Am I?*, an instrument that evaluates the developmental level of young children (De Lemos 2002). More information about the copying and symbol use instrument in the NLSCY may be found in the *Microdata User Guide* for the NLSCY for cycle 7, page 150-152 (Statistics Canada n.d.b).

For some analyses in this paper, copying and symbol use score was analyzed as a two-level variable, low copying and symbol use score (below the median) and higher copying and symbol use score (above the median).

Receptive vocabulary score. The measure of receptive vocabulary at age 5 was the standard score on the Peabody Picture Vocabulary Test – Revised (PPVT-R). More information about the PPVT-R in the NLSCY may be found in the *Microdata User Guide* for the NLSCY for cycle 7, page 146-148 (Statistics Canada n.d.b).

For some analyses in this paper, receptive vocabulary score was analyzed as a two-level variable, low receptive vocabulary score (below the median) and higher receptive vocabulary score (above the median).

Attention ability at age 5. The attention score for 5-year olds at cycle 5 included responses to a set of six individual items. The Cronbach's alpha measure of internal reliability for this score was 0.77. Five of the items were identical to the five items listed above for the 9-year-olds, with the same response options. Parents were asked:

How often would you say that (CHILD):

1. *Can't sit still or is restless?*
2. *Is easily distracted, has trouble sticking to any activity?*
3. *Can't concentrate, can't pay attention for long?*
4. *Is inattentive?*
5. *Can not settle on anything for more than a few moments?*

Response options were: *never or not true, sometimes or somewhat true*, and *often or very true*. Responses were scored 2 for *never or not true*, 1 for *sometimes or somewhat true*, and 0 for *often or very true*.

A sixth item was included as follows:

6. *How often does (CHILD): listen well and pay attention?* (reversed)

Response options were: *never, sometimes*, and *often*. Responses were scored 0 for *never*, 1 for *sometimes*, and 2 for *often*.

Possible scores for attention ability at age 9 ranged from 0 (low attention score) to 10 (high attention score).

For some analyses, attention ability at age 9 was analyzed as a two-level variable, low attention ability (at or below the 15th percentile score of 4) and higher attention ability (above the 15th percentile score, that is, 5 or higher). Where cell numbers were low, attention ability at age 9 was analyzed as a two-level variable with a cut-off at the 25th percentile. Where this condition applies, the cut-off is indicated in the chart and text.

10 Data analysis

Coefficient of variation. The coefficient of variation (CV) is a relative measure of variability that can be used to compare the quality of estimates. It is calculated by dividing the square root of the variance of the estimate, by the estimate itself. Note that the square root of the variance is also known as the **standard error**. Estimates with CVs of 16.5% or lower are considered to be of acceptable quality by Statistics Canada, and can be released without warning. Estimates with CVs in the range of 16.6% to 33.3% are of marginal quality, and should be accompanied with a warning about the relatively high levels of error. Estimates with CVs in excess of 33.3% are considered to be of unacceptable quality by Statistics Canada. Almost all CVs in the present report were in the acceptable range. The small number of estimates in the marginal range have been flagged in the tables.

Bootstrap weights for variance estimation. The following information was taken from the *Microdata User Guide* of the NLSCY for cycle 5 (Statistics Canada, n.d.b).

It would be difficult to derive an exact formula to calculate the sampling variance for the NLSCY due to the complex sample design, non-response adjustments, treatment of out-of-scope units, and the post-stratification. A very good way to approximate the sampling variance is to use the Bootstrap method. The idea behind the Bootstrap method is to select random sub-samples from the full sample in such a way that each of the sub-samples (or replicates) follows the same design as the full sample. The final weights for units in each replicate are recalculated following the same weighting steps used for the full sample…. These Bootstrap weights are used to calculate a population estimate for each replicate. The variance among the replicate estimates for a given characteristic is an estimate of the sampling variance of the full sample population estimate. For the NLSCY, a set of 1,000 Bootstrap weights is available. The sampling variance calculation using these 1,000 Bootstrap weights involves calculating the estimates with each of these 1,000 weights and then calculating the variance of these 1,000 estimates (p.166).

The variances and standard errors of all estimates in the present study were calculated using the bootstrap weights that were developed by Statistics Canada for the 2006/2007 cross-sectional sample. Cross-sectional weights were used for the longitudinal analysis because the sample being studied was 9-year-old children in 2006/2007, and the analysis involved looking back at their status in 2002/2003 when they were 5-year-olds.

Statistical and substantive significance

The difference between statistical and substantive, or practical, significance has been summarized by Kirk (1996) as follows: "Statistical significance is concerned with whether a research result is due to chance or sampling variability: practical significance is concerned with whether the result is useful in the real world (p. 746)."

Because of the large size of the sample under study, many statistics were statistically significant even though the effects were small, and of little practical interest. "(P)ower ... is heavily dependent on sample size. Thus, given very large sample size (say, group sizes >200), most effects will be declared statistically significant at the .05 level. If significance is found, then we must decide whether the difference in means is large enough to be of practical significance. There are several ways of getting at practical significance: among them are

1. Confidence intervals.
2. Effect size measures.
3. Measures of association (Stevens 2002, p. 9-10)."

In this report, effect size measures were used to establish substantive, or practical, significance, and only effects that were both statistically and substantively significant are reported as significant. Standards of substantive significance in this report were derived from those established by Cohen (1988), as summarized below. A detailed discussion of these effect sizes, and Cohen's widely followed convention of defining "small", "medium", and "large" effects, can be found in his text (Cohen 1988).

Substantive significance. Unless noted otherwise, in this report substantively significant effects were defined as:

1. percentage differences of 5 points or more for most proportions; for rare phenomena where proportions were small, the 5-point standard was confirmed using Cohen's effect size index **h**, with a standard of **h**=.20 (Cohen 1988 p. 180-185);

2. mean differences of 0.25 of a standard deviation or more;

3. correlation coefficients of r=0.22 or greater (r^2=0.05);

4. incremental R^2 of 0.01 (1%) or greater.

Statistical significance. Where multiple comparisons were made within a particular predictor variable (e.g., household income level), the nominal significance level of p=0.05 was adjusted for the number of comparisons. Where single comparisons were made, a significance level of p=0.01 was used.

Appendix A — Supporting tables

Table A
Mathematics test score in grade 3 and 4 by child and family characteristics

	Mathematics test score			
	Grade 3		Grade 4	
	mean	standard error	mean	standard error
Sex of child				
Girls	335.9	4.93	371.8	1.85
Boys	333.6	4.34	373.5	1.84
Household income level				
Very low income	325.1	6.99	363.6	4.16
Higher income	336.6	3.76	373.9	1.43
Province of residence				
Newfoundland and Labrador	...	...	362.0[1]	3.31
Prince Edward Island	...	...	403.5[1]	5.23
Nova Scotia	...	...	351.2[1]	6.05
New Brunswick	...	...	368.3[1]	7.50
Quebec	...	...	391.1[1]	3.10
Ontario	...	...	366.7[1]	2.25
Manitoba	...	...	369.9	3.97
Saskatchewan	...	...	361.2[1]	3.98
Alberta	...	...	372.2	3.08
British Columbia	...	...	379.5	3.75
All children	**334.7**	**3.59**	**372.7**	**1.38**

1. Statistically significant and substantive difference between Newfoundland and Labrador and Prince Edward Island, Quebec, British Columbia; between Prince Edward Island and Nova Scotia, New Brunswick, Ontario, Manitoba, Saskatchewan, Alberta, British Columbia; between Nova Scotia and Quebec, British Columbia; between New Brunswick and Quebec; between Quebec and Ontario, Manitoba, Saskatchewan, Alberta; between Ontario and British Columbia; between Saskatchewan and British Columbia. No other provincial differences were statistically significant at $p<0.001$.

Note(s): Statistical significance: $p<0.001$ for differences among the 10 levels of province of residence (nominal significance level of $p<0.05$ adjusted for multiple comparisons). Substantive differences are defined as mean differences of 0.25 of a standard deviation (0.25 SD) or more, as follows: for mathematics score in grade 3, 0.25 SD=12.66; in grade 4, 0.25 SD=12.62.

Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

Table B
Attention score at age 9 by child and family characteristics

	Attention score	
	mean	standard error
Sex of child		
Girls	7.5[1]	0.07
Boys	6.7	0.07
Household income level		
Very low income	6.7	0.17
Higher income	7.2	0.60
Province of residence		
Newfoundland and Labrador	7.5	0.15
Prince Edward Island	7.4	0.22
Nova Scotia	7.0	0.22
New Brunswick	7.3	0.17
Quebec	6.9	0.11
Ontario	7.2	0.09
Manitoba	7.1	0.15
Saskatchewan	6.9	0.15
Alberta	7.2	0.14
British Columbia	6.9	0.19
All children	**7.1**	**0.06**

1. Statistically significant and substantive difference between levels.
Note(s): Statistical significance: p<0.01 for differences between levels of sex of child. Substantive differences are defined as mean differences of 0.25 of a standard deviation (0.25 SD) or more, as follows: for attention score at age 9, 0.25 SD=0.62.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

Table C
Mathematics score in grade 3 and 4 by three school outcome measures at age 9

	Mathematics test score			
	Grade 3		Grade 4	
	mean	standard error	mean	standard error
Attention ability				
Low attention (25 th percentile)	318.3 [1]	6.27	360.6 [1]	2.71
Higher attention	341.2	3.84	376.7	1.46
Girls				
Low attention (25 th percentile)	311.2 [1]	8.69	357.6 [1]	4.05
Higher attention	343.9	5.30	375.3	2.10
Boys				
Low attention (25 th percentile)	322.4	7.84	362.6 [1]	3.52
Higher attention	338.6	4.87	378.3	2.17
Repeated a grade				
Repeated a grade	314.2 [1]	6.24	...	...
Did not repeat a grade	339.9	3.95	...	...
Girls				
Repeated a grade	316.3	9.04	...	...
Did not repeat a grade	339.9	5.46	...	...
Boys				
Repeated a grade	313.0 [1]	8.77	...	...
Did not repeat a grade	339.9	4.57	...	...
Very low income household				
Repeated a grade	314.9	11.70	...	...
Did not repeat a grade	330.6	8.34	...	...
Higher income household				
Repeated a grade	314.0 [1]	7.35	...	...
Did not repeat a grade	341.4	4.02	...	...
How is the child doing in mathematics?				
Average, not well	308.0 [1]	4.74	350.2 [1]	2.31
Well, very well	344.8	3.98	381.1	1.48

1. Statistically significant and substantive difference between levels.
Note(s): Statistical significance: p<0.01 for differences between levels. Substantive differences are defined as mean differences of 0.25 of a standard deviation (0.25 SD) or more as follows: for mathematics score in grade 3, 0.25 SD=12.66; in grade 4, 0.25 SD=12.62.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

Table D
Children at age 9 whose parents reported various levels of importance of good grades in school, by child and family characteristics

	How important is it to you that this child have good grades in school?					
	Not important, somewhat important		Important		Very important	
	percent	standard error	percent	standard error	percent	standard error
Sex of child						
Girls	6.6	0.74	33.7	1.35	59.7	1.39
Boys	6.1	0.81	33.4	1.44	60.5	1.64
Household income level						
Very low income	6.5	1.53	28.1	2.74	65.4	2.99
Higher income	6.3	0.57	34.5	1.05	59.2	1.17
All children	**6.3**	**0.55**	**33.6**	**1.01**	**60.1**	**1.15**

Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

Table E

Children at age 9 whose parents reported various academic aspirations for them, by child and family characteristics

	How far do you hope this child will go in school?							
	University		Other post-secondary		Community college		Other [1]	
	percent	standard error	percent	standard error	percent	standard error	percent	standard error
Sex of child								
Girls	63.0	1.51	18.9	1.29	8.80	0.98	9.3	0.88
Boys	58.1	1.62	17.0	1.19	11.3	0.99	13.7	1.15
Household income level [2]								
Very low income	50.2	3.15	12.9	2.06	13.1	2.09	23.8	2.71
Higher income	62.2	1.09	18.8	0.97	9.6	0.77	9.4	0.70
Community size [3]								
Rural	41.1	2.89	26.3	3.01	12.8[E]	3.24	19.8	1.94
Under 30,000	52.2	3.53	22.6	3.33	11.6[E]	2.26	13.6[E]	2.95
30,000 to less than 100,000	46.7	4.65	22.2[E]	5.74	14.4[E]	2.68	16.7[E]	3.47
100,000 to less than 500,000	63.0	2.68	18.0	2.08	11.3[E]	1.91	7.7[E]	1.53
500,000 and over	69.2	1.51	13.9	1.13	7.6	0.94	9.2	0.98
All children	**60.5**	**1.09**	**17.9**	**0.93**	**10.1**	**0.71**	**11.5**	**0.77**

1. Includes secondary school completion or less; trade, technical or business training.
2. Statistically significant association between variables (Chi-square=11.39, 3df, p<0.000).
3. Statistically significant association between variables (Chi-square=8.42, 12 df, p<0.000).

Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

Table F

Children at age 9 whose parents reported talking to the child about friends and activities and about school work and behaviour, by child and family characteristics

	How often do you and this child talk about. . .					
	School work or behaviour in class?					
	Once a week or less		A few times a week		Daily	
	percent	standard error	percent	standard error	percent	standard error
Sex of child						
Girls	8.6	0.88	22.9	1.33	68.5	1.42
Boys	10.7	1.00	21.9	1.21	67.5	1.45
Household income level						
Very low income	14.3	2.29	20.3	2.60	65.4	2.93
Higher income	8.9	0.71	22.7	0.96	68.4	1.07
All children	**9.7**	**0.69**	**22.4**	**0.89**	**68.0**	**1.01**

	His/her friends or activities?					
	Once a week or less		A few times a week		Daily	
	percent	standard error	percent	standard error	percent	standard error
Sex of child						
Girls	4.3	0.67	20.7	1.27	75.0	1.40
Boys	5.8	0.81	23.4	1.31	70.7	1.46
Household income level [1]						
Very low income	12.2	2.40	23.9	2.68	63.9	3.19
Higher income	3.9	0.46	21.8	1.02	74.3	1.10
All children	**5.1**	**0.53**	**22.1**	**0.91**	**72.8**	**1.00**

1. Statistically significant association between variables (Chi-square=6.22, 2 df, p<0.01).

Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

Table G
Children at age 9 whose parents reported that they had daily homework, by child and family characteristics

	Child has daily homework	
	percent	standard error
Sex of child		
Girls	52.7	1.61
Boys	54.5	1.62
Household income level		
Very low income	53.9	3.10
Higher income	53.6	1.22
Province of residence [1]		
Newfoundland and Labrador	81.4	3.12
Prince Edward Island	80.3	3.49
Nova Scotia	51.2	5.38
New Brunswick	75.6	5.53
Quebec	71.6	3.04
Ontario	51.9	1.93
Manitoba	41.8	3.75
Saskatchewan	25.1	4.68
Alberta	41.9	2.75
British Columbia	40.9	3.06
All children	**53.7**	**1.18**

1. Statistically significant association between variables (Chi-square=28.80, 9 df, p<0.000).
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

Table H
Children at age 9 whose parents reported checking or helping with homework, by homework frequency and child and family characteristics

	How often do you check this child's homework or provide help with homework?					
	Once a week or less		A few times a week		Daily	
	percent	standard error	percent	standard error	percent	standard error
Frequency of homework [1]						
Not daily	31.6	1.66	42.0	1.67	26.4	1.81
Daily	6.5	0.85	11.8	1.04	81.7	1.26
Sex of child						
Girls	18.3	1.22	27.0	1.50	54.7	1.59
Boys	17.5	1.28	24.1	1.38	58.4	1.68
Household income level						
Very low income	19.2	2.68	27.7	2.76	53.1	3.41
Higher income	17.7	0.94	25.2	1.11	57.2	1.27
All children	**17.9**	**0.93**	**25.5**	**1.07**	**56.6**	**1.23**

1. Statistically significant association between variables (Chi-square=319.44, 2 df, p<0.000).
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

Table I

Children at age 9 whose parents participated in four or more activities at school, by child and family characteristics

	Participated in four or more activities at school	
	percent	standard error
Sex of child		
Girls	81.4	1.37
Boys	78.4	1.34
Household income level [1]		
Below low income cut-off	68.7	3.08
Low income cut-off to less than 2 times low income cut-off	75.7	1.69
Two times to less than 3 times low income cut-off	84.2	1.50
Three times low income cut-off or above	88.4	1.39
All children	**79.9**	**1.01**

1. Distribution of proportions differs significantly from equality (Chi-square=19.22, 3 df, p<0.000).

Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

Table J

Positive school climate score by child and family characteristics

	Positive school climate score	
	mean	standard error
Grade in school		
Grade 3	11.5	0.15
Grade 4	11.7	0.06
Sex of child		
Girls	11.7	0.07
Boys	11.6	0.08
Household income level		
Below low income cut-off	11.3 [1]	0.16
Low income cut-off to less than 2 times low income cut-off	11.6	0.09
Two times to less than 3 times low income cut-off	11.7	0.09
Three times low income cut-off or above	11.9	0.10
Community size		
Rural	11.5	0.14
Under 30,000	11.7	0.14
30,000 to less than 100,000	12.1	0.22
100,000 to less than 500,000	11.8	0.13
500,000 and over	11.6	0.08
All children	**11.7**	**0.06**

1. Statistically significant and substantive difference between level 1 and level 4.

Note(s): Statistical significance: p<0.008 for differences between levels of household income level (nominal significance of p<0.05 adjusted for multiple comparisons). Substantive differences are defined as mean differences of 0.25 of a standard deviation (0.25 SD) or more as follows: for positive school climate score, 0.25 SD = 0.55.

Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

Table K
Mathematics test score at age 9 for children in grade 3 and 4 according to school readiness indicators at age 5

	Mathematics test score			
	Grade 3		Grade 4	
	mean	standard error	mean	standard error
Receptive vocabulary (number)	**421**	...	**2,427**	...
Lower score (below median)	322.7 [1]	4.58	368.4	2.15
Higher score (median and above)	350.8	4.07	376.8	1.59
Number knowledge (number)	**423**	...	**2,431**	...
Lower score (below median)	326.1 [1]	3.78	361.0 [1]	1.88
Higher score (median and above)	353.3	5.32	382.8	1.81
Copying and symbol use (number)	**402**	...	**2,332**	...
Lower score (below median)	327.7 [1]	4.15	361.7 [1]	2.05
Higher score (median and above)	360.1	6.46	382.2	1.79

1. Statistically significant and substantive difference between levels.
Note(s): Statistical significance: p<0.01 for differences between levels. Substantive differences are defined as mean differences of 0.25 of a standard deviation (0.25 SD) or more, as follows: for mathematics score in grade 3, 0.25 SD=12.66; in grade 4, 0.25 SD=12.62.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

Table L
Children at age 9 who were higher in attention according to attention at age 5, by child and family characterics

	Higher in attention at age 9	
	percent	standard error
Girls		
Low attention age 5	67.3 [1]	4.15
Higher attention age 5	90.9	0.93
Boys		
Low attention age 5	52.3 [1]	3.56
Higher attention age 5	87.9	1.25
Household income level		
Below low income cut-off		
Low attention age 5	60.0 [1]	6.63
Higher attention age 5	86.9	2.91
Low income cut-off to less than 2 times low income cut-off		
Low attention age 5	62.2 [1]	4.64
Higher attention age 5	90.3	1.28
Two times to less than 3 times low income cut-off		
Low attention age 5	48.0 [1]	5.63
Higher attention age 5	86.1	1.64
Three times low income cut-off or above		
Low attention age 5	61.7 [1]	6.47
Higher attention age 5	93.1	1.08
All children		
Low attention age 5	57.9 [1]	2.91
Higher attention age 5	89.4	0.82

1. Statistically significant and substantive difference between levels.
Note(s): Higher attention scores were those above the 15th percentile; low attention scores were those below the 15th percentile. Statistical significance: p<0.01 for differences between levels. Substantive differences are defined as mean differences of 0.25 of a standard deviation (0.25 SD) or more, as follows: for attention score at age 9, 0.25 SD=0.62.
Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

Table M

School readiness indicators at age 5 by repeating a grade, participating in special education, and receiving tutoring or extra help at age 9

	School readiness indicator at age 5					
	Receptive vocabulary score		Number knowledge score		Copying and symbol use score	
	mean	standard error	mean	standard error	mean	standard error
Repeating a grade						
Repeated a grade	91.2[1]	1.76	85.7[1]	1.62	84.0[1]	1.59
Did not repeat	102.0	0.42	99.6	0.35	101.4	0.33
Participation in special education						
In special education	90.2[1]	2.92	87.0[1]	1.65	86.7[1]	2.58
Not in special education	102.0	0.41	99.5	0.36	101.3	0.34
Receiving tutoring or extra help						
Receiving tutoring	96.5[1]	0.76	92.4[1]	0.65	93.3[1]	0.74
Not receiving tutoring	102.9	0.46	100.9	0.40	102.7	0.38

1. Statistically significant and substantive difference between levels.

Note(s): Statistical significance: p<0.01 for differences between levels. Substantive differences are defined as mean differences of 0.25 of a standard deviation (0.25 SD) or more, as follows: for receptive vocabulary score at age 5, 0.25 SD=3.81; for number knowledge score at age 5, 0.25 SD=3.51; for copying and symbol use score at age 5, 0.25 SD=3.68.

Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.

Table N

School readiness indicators at age 5 by parent report of how the child was doing in school at age 9

	School readiness indicator at age 5					
	Receptive vocabulary score		Number knowledge score		Copying and symbol use score	
	mean	standard error	mean	standard error	mean	standard error
How is the child doing at school overall?						
Not well	96.7[1]	0.75	92.7[1]	0.60	93.6[1]	0.77
Well	103.2	0.46	101.3	0.40	103.1	0.39
Girls						
Not well	...	...	...	...	97.1[1]	1.01
Well	...	...	...	...	106.4	0.47
Boys						
Not well	...	...	...	...	91.1[1]	1.08
Well	...	...	...	...	99.5	0.61

1. Statistically significant and substantive difference between levels.

Note(s): Statistical significance: p<0.01 for differences between levels. Substantive differences are defined as mean differences of 0.25 of a standard deviation (0.25 SD) or more, as follows: for receptive vocabulary score at age 5, 0.25 SD=3.81; for number knowledge score at age 5, 0.25 SD=3.51; for copying and symbol use score at age 5, 0.25 SD=3.68.

Source(s): Statistics Canada: National Longitudinal Survey of Children and Youth 2006/2007.